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Millennium Challenge

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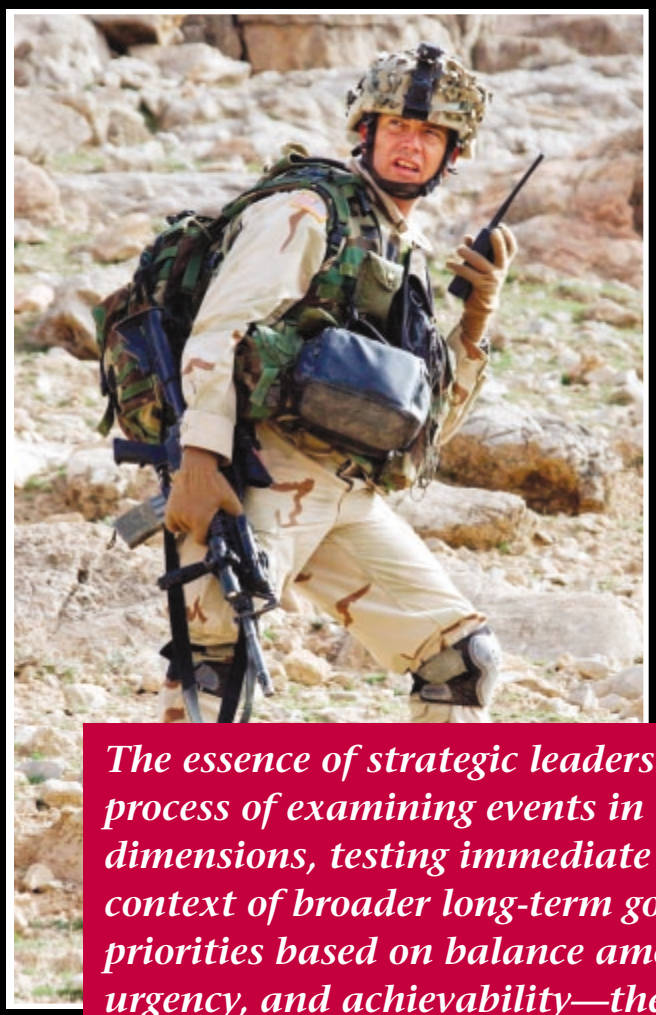

The essence of strategic leadership is the process of examining events in their many dimensions, testing immediate issues in the context of broader long-term goals, establishing priorities based on balance among importance, urgency, and achievability—then pursuing policies in the near term aimed at securing the long-range objectives.

—Donald E. Rumsfeld

JFQ

A Word from the Chairman

Soldiers preparing for mission in Afghanistan.

U.S. Army (Milton H. Robinson)

Joint warfighting is constantly evolving in theory and practice. Military and defense professionals train for and expect operations to be joint. To win, we must fight as a team. And combatant commanders plan on joint operations as a matter of course. Recently, the term *joint* has begun to assume a broader common definition and an air of expectedness.

It is routine for more than one service to perform together in experiments, exercises, or battles. Joint operations are our baseline. Yet in discussing jointness we tend to envision far more than just two services working together. We see a joint team functioning with other agencies as well as foreign nations and perhaps even nongovernmental organizations.

The global war on terrorism ushered in an era of enhanced jointness in which coalition and interagency participation is the norm. Professional military education promotes integration among services, agencies, and allies, who are all routinely included in exercises and operations.

Within the Government, we find considerably more common, comprehensive, and important interagency cooperation. Warfighting commands and various agencies must be aware of

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JFQ FORUM

PHOTO CREDITS

The cover shows lift off of Delta II rocket from Cape Canaveral (Boeing). The front inside cover features [clockwise] soldier, Enduring Freedom (55th Signal Company/Leopold Medina, Jr.); sailor aboard *USS Harry S. Truman,* Iraqi Freedom (*USS Harry S. Truman*/Danny Ewing, Jr.); marine during live fire exercise (Fleet Combat Camera, Pacific/Michael Sandberg); and airman monitoring air traffic, Iraqi Freedom (U.S. Air Force/Stefan Alford). The table of contents depicts universe seen from Hubble Space Telescope (AP/Wide World Photo/NASA); and Global Hawk UAV at air base in Australia (U.S. Air Force/Jeremy Lock). The back inside cover captures *USS Providence* sailing home to New London (U.S. Navy/Nicole Hawley).

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The editors invite articles and other contributions on joint warfighting, interservice issues that support jointness, and topics of common interest to the Armed Forces (see page 132 for details). Please direct all editorial communications to:

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(continued from page 1)

each other's plans and coordinate actively. Intelligence sharing, homeland defense, and synchronizing instruments of power are necessary to win the global war on terrorism.

Moving from service competition to routine joint operations has been accompanied by a significant cultural change. We must continue this evolution to embrace a new concept of enhanced joint operations—changes in the Armed Forces, governmental agencies, and allied nations.

History not only tells us where we have been; it offers clues about where we need to go. To illustrate the evolution of jointness, let me touch on just a few examples, from tentative cooperation among services to the enhanced joint warfighting required to combat terrorism.

Experimenting in Wartime

Interestingly, the tradition of joint warfighting can be traced to the early days of the Nation. For example, by April 1863, General Ulysses Grant had been trying to take Vicksburg for months. But nature provided an obstacle, spring rains. Union forces had to move quickly down the Mississippi River past the deadly Vicksburg defensive batteries to attack from the east—Grant's preferred approach. After seeking the counsel of Admiral David Porter, they elected to sail Union troops and supplies down the Mississippi.

With cavalry raids as a distraction, the riverborne transport scheme worked. The Union lost only one ship to the batteries. Grant was able to isolate Vicksburg from the east. Confederate forces finally surrendered July 4. Experimenting with joint warfighting helped the Union turn the tide of the Civil War. This series of events foreshadowed the importance of jointness to later military successes.

A Costly Lesson

The defeat at the Kasserine Pass exemplifies the poor integration and communication that led to tragedy during Operation Torch in February 1943. The operation was designed to drive Axis forces out of North Africa, but our troops were inexperienced and untested. American leaders tried to use airpower simultaneously as artillery and an umbrella for ground units. Unfortunately, inadequate communications, planning, and synchronization plagued the Allied forces.

The Allies ceded air superiority, leading to insufficient air support for ground operations in the pass. Unable to achieve control of the air over the battlefield, ineffective air support combined with inexperienced American troops and poor battlefield communications led to a costly defeat by troops under General Erwin Rommel.

F/A–18C taking off, Iraqi Freedom.

U.S. Navy (Philip A. McDaniel)

However, the Allies learned from their mistakes and issued new orders for Allied airpower to strike interdiction and rear echelon targets. This allowed airpower to decimate Axis support logistics in Tunisia and helped turn the balance in favor of the Allies.

With a more focused and synchronized air campaign, fortified Allied surface forces pushed the Axis back. Adolf Hitler all but abandoned his African army. And in May 1943, the Axis lost North Africa and the Allies prepared for a push north through Italy.

Desert Storm highlighted the role of precision and ad hoc innovations in the area of time-sensitive targeting

The North African campaign illustrated that Allied combined arms warfare could be inefficient and dangerous when planned poorly. Allied commanders quickly learned the importance of coordinated and integrated planning between components and nations.

Jointness in the Storm

In 1991, Operation Desert Storm showed unprecedented jointness on a theater-wide scale. Yet while successful in achieving U.S. and Coalition objectives, the war was often a segregated affair—more deconflicted than integrated.

Desert Storm introduced new concepts of operations and innovations that previewed the military transformation of the 1990s. Perhaps the greatest was effects-based operations. This concept promoted an attempt to control an enemy, as opposed to traditional warfighting strategies of attrition or annihilation.

The Coalition commander would restrict enemy decisionmaking processes in order to take away options. In Desert Storm, the Coalition was able to accomplish this without entirely crushing Iraq's infrastructure or annihilating its army.

Precision, speed, and superior intelligence allowed the Coalition to target the enemy by disrupting its command and control and decisionmaking. Countrywide military pressure all but paralyzed the Iraqi leadership, and a crushing ground assault pushed dug-in enemy troops from Kuwait.

Desert Storm highlighted the role of precision and ad hoc innovations in the area of time-sensitive targeting. The Scud hunting operations in western Iraq particularly reflected a new capability, leading to a decade of experimentation with joint time-sensitive targeting procedures and technology.

The Scud hunt saw Special Operations Forces (SOF) closely collaborating with the air component on near real-time strikes. In one case in 1991, a team was bracing for assault by an enemy helicopter in western Iraq. The team radioed an airborne F–15E and passed their position and situation. The fighter launched and guided a 2,000-pound laser guided precision bomb, destroying the hovering helicopter.

This type of SOF-airpower coordination was desperate, unplanned, and impractical, but it worked. As a result, nascent collaboration between Special Operations Forces and joint aerospace power became a preview of hugely effective tactics used in Afghanistan. However, despite some limited successes in Desert Storm, the potential of special operations was largely unrealized.

Enduring Freedom

After the atrocities of 9/11, Operation Enduring Freedom showed the inherent flexibility of the U.S. joint force and the importance of a new style of coalition operations. Special operators of all services, and coordination with elements of several U.S. and allied governmental agencies, were commonplace and critical.

during Millennium Challenge, the decision and execution process in time-sensitive targeting often took less than an hour

SOF teams collaborated successfully with Coalition air components and together delivered bombs and shared satellite communications, navigation, and a host of intelligence assets. The result reinforced the importance of even more effective integration and new operational concepts. The services had gone to school on Desert Storm experiences in Scud hunting and integrating sea, air, space, and SOF assets.

Afghanistan demonstrated a new paradigm where select U.S. forces, supported by joint air- and spacepower, could act as force multipliers. In Enduring Freedom, 21st century technology paired cavalry charges—right out of the 14th century—with the most advanced weapons to defeat a larger army of well-equipped fighters. In fact, the force multiplication capability of air- and spacepower teamed with Special Operations Forces was unprecedented. In December 2001, when the Taliban fell from power, only about 1,500 American military personnel were on the ground. However, their combat effectiveness surpassed traditional views of their capabilities.

The importance of this new jointness became evident after 9/11 and was reinforced by American successes in Afghanistan. SOF and interagency assets were integrated and integral to the plan and the operation. And in preparing lessons learned while the operation was unfolding, the services, joint components, and combatant commands shared notes and experimented with improvements in strategy, technology, and operational coordination.

Millennium Challenge

In summer 2002, U.S. Joint Forces Command conducted Millennium Challenge, a large experiment that generated thousands of data points and hundreds of ideas. Participants examined dozens of concepts, initiatives, and warfighting issues. One highlight was the joint fires initiative for time-sensitive targets, a Web-based, collaborative tool that allowed land, maritime, and air commanders to share awareness and knowledge simultaneously. Allies also participated.

All components knew the priority targets selected by the joint force commander. They had access to intelligence, surveillance, and reconnaissance assets of other components to find targets. Once found, they chatted in real time on which component could engage those targets. At the same time, they decided which assets could best conduct post-strike battle damage assessment.

During Millennium Challenge, the decision and execution process in time-sensitive targeting often took less than an hour. By sharing information and fostering trust, the joint team got the job done with considerably improved timelines. They had developed a faster decision cycle—and history shows that those who make better decisions faster usually win.

Iraq and the War on Terrorism

The joint fires initiative and the time sensitive targeting tested and refined in Millennium Challenge and in Afghanistan continued to evolve during Iraqi Freedom. An attack against Saddam Hussein in a hotel took 45 minutes—from the time we received the intelligence to bombs hitting the target. Our time to attack can be under an hour, but we need to push for a faster response.

The common operating picture is also a great example of the type of integration and information sharing that speeds decisionmaking and is truly transformational. In Desert Storm, the air component commander had a reasonably good battlefield picture. During the battle in Afghanistan, the air component commander had a much better picture, with considerably more real-time sensor information conveniently displayed in addition to the blue force positions.

Marines refueling near Az Zubayr, Iraq.

1st Marine Division Combat Camera (Kevin C. Quihuis, Jr.)

But throughout the 1990s, and even in Afghanistan during Enduring Freedom, the ground component had poorer connectivity and a less complete picture.

For Iraqi Freedom, however, U.S. Central Command insisted that all the components share a very similar picture of the battlefield and theater. Information sharing enabled the component commanders to provide reachback support to forward tactical units and to coordinate and integrate their plans. The ground command operations center in Doha, Qatar, was as sophisticated as the combined air operations center in Saudi Arabia. And just as importantly, the corps commander and division commanders shared this common operating picture as well.

Iraqi Freedom portended a crucial trend useful for fighting the global war on terrorism: the increasing importance of multiple agencies and nations combining efforts over an extended period. It demonstrated the effectiveness of long-term, multifaceted relationships between organizations and allies geared toward achieving common goals. In the case of Iraq, this meant:

- diplomatic efforts at coalition building
- years of weapons and tactics improvements in all the components
- reducing Iraqi air defense and command and control capabilities through months of targeted airstrikes
- months of focused and deliberate psychological operations against Iraqi military commanders, troops, and regime supporters
- years of sanctions on the regime and terrorist leaders
- preparation for humanitarian and civil emergencies
- maritime control of the Arabian Gulf
- in due course, a closely coordinated and flexible, 24/7, all-weather land-sea-air and SOF component blitz that crushed the Iraqi military.

But what won the war was the ability of the Coalition to remove the enemy sanctuary in time and space. This was done by integrating a range of combat and other capabilities, as well as overcoming unique logistic challenges. Iraqi Freedom has illustrated the importance of enhanced jointness—with shared intelligence and coordinated informational, diplomatic, economic, and military actions contributing to an unprecedented success.

The combatant commander achieved superiority in all areas of space and time, which led to Coalition success in the major combat phase. He was able to make better decisions faster than the enemy. Well understood rules of engagement and exceptional red teaming and planning for what-ifs made the most of Coalition flexibility—and gave friendly forces a tighter decision cycle. He

B–52 heading for Iraq.

30th Communications Squadron (Richard Freeland)

gained air and space superiority. And joint air- and spacepower enabled persistent surveillance and strike operations. A rapid maneuver campaign by the ground component was supported by air and psychological operations, as well as by space navigation and communications. Though the fighting was intense, Coalition ground forces were able to push quickly to Baghdad with skill and determination.

When some pundits erroneously stated that the ground advance was bogged down or stalled during a blinding sandstorm, they missed the deadly precision attacks and incredible all-weather capability of the joint and combined team. During that sandstorm, Coalition airpower worked in concert with precision ground maneuvers to decimate two Republican Guard divisions—breaking the back and crushing the morale of the Iraqi military. Coalition precision attack and C4ISR capability was the result of years of research and development, exceptional weapons, shared knowledge between component and combatant commanders, and appropriate rules of engagement.

Effectively, integrated components did the fighting in Iraqi Freedom. Commanders and planners included allied and American personnel from other agencies from the start. This enhanced capability, whereby components integrate and include allies and interagency personnel in planning and execution, must be a key characteristic of combatting terrorism.

Unlike Iraqi Freedom, most battles in the global war on terrorism will not be conventional. As a result, all elements of national power must be better integrated. Financial services, law enforcement, diplomatic efforts, and commercial activities both at home and abroad, as well as humanitarian and civil organizations, must be included in all appropriate phases, from planning to combat to the transition to a lasting peace.

As Iraqi Freedom moves into the stability phase, we will continue to fight the global war on terrorism. This requires continuing to coordinate and share information across agency, component, and command lines. We must do better in synchronizing current operations with all instruments of national power and in sharing intelligence to anticipate and deny future attacks.

To fully integrate the Armed Forces, we must breach institutional stovepipes and establish effective lines of communication. For the most part, culture will also have to change with regard to classified intelligence—*need to know* must give way to the *need to share*. We must calculate the risk of exchanging intelligence in this new enhanced environment with other agencies and countries. I bet that careful calculation will indicate that it is safer to share information to preclude terrorist attacks than retain overclassified information that no one acts on. I know this will be a big change, but a new risk calculus reflects our enhanced joint world.

Historical lessons are anecdotes, not prescriptions for the future. The only thing we can be sure of after the recent war in Iraq is that our next major operation will be quite different. Therefore, we must be prepared for a variety of contingencies. The enhanced joint environment I have described will encourage sharing information and deliberately coordinating the instruments of power in planning and in execution.

This flexibility accompanied by operating across organizational seams will ultimately make the United States and its allies stronger and safer. We can be certain that in moving from a segregated to an integrated approach, the whole becomes greater than the sum of its parts—just as our forebears found in fighting the Nation's wars of the distant past.

RICHARD B. MYERS
Chairman
of the Joint Chiefs of Staff

North Korean nuclear fuel rods, Yongbyon.

A Quiet Revolution
Nuclear Strategy for the 21st Century

By JAMES J. WIRTZ *and* JAMES A. RUSSELL

AP/Wide World Photo

There is a quiet revolution underway in U.S. nuclear strategy. It is overshadowed by the global war on terrorism, questions over homeland security, and chaos in the international order. It is revolutionary because it reflects many changes in threats, capabilities, and doctrine that have preoccupied nuclear planners since the 1950s. It also highlights the way the Armed Forces prepare for future conflicts.

The vision found in the Nuclear Posture Review (NPR) is part of a wider endeavor to develop new policies.[1] It embraces the concepts of assurance, dissuasion, deterrence, defense, and denial articulated in the Quadrennial Defense Review in 2001. Both reviews set priorities for formulating defense and foreign policy, developing a strategic relationship with Russia, and countering proliferation of nuclear, biological, and chemical (NBC) weapons and long-range ballistic missiles.

James J. Wirtz is the chairman and James A. Russell is Office of the Secretary of Defense fellow in the National Security Affairs Department at the Naval Postgraduate School.

New Threats, New Opportunities

Nuclear policy reflects strategic, political, and technological trends that emerged over the last decade. The collapse of the Soviet Union presented an opportunity to foster a new strategic relationship. The United States concluded that massive nuclear arsenals, which had produced the concept of mutual assured destruction (MAD), arms control agreements, and many views of the

Dismantling Tu-160 in Ukraine.

AP/Wide World Photo (Efrem Lukatsky)

Cold War, were no longer relevant. Moreover, both countries would benefit by reducing defense budgets. During the 2000 Presidential campaign, supporters of George Bush noted that the arms control regime prevented adjustments to meet fiscal realities and new threats. Arms control was the source of acrimony; the time had come to stop regarding Russia as an enemy and to develop a more cooperative approach to managing strategic relations.

Though many observers marveled at the effectiveness of precision-guided air strikes in the Persian Gulf War, advances in technology did not stop. The information revolution of the 1990s continued to transform military capabilities. Sometimes called the revolution in military affairs, it involved integrating surveillance and reconnaissance sensors, information processing, tactical and operational communications, and precision-guided munitions. Today, commanders can use data from myriad sensors—generically known as the global command and control system—to acquire a picture of the battlespace in real time, a capability that did not exist ten years ago. The Pentagon wants to use advances in command, control, communications, computers, and intelligence (C^4I) to integrate nuclear and conventional forces so they can be responsive on short notice.

commanders can use data from myriad sensors to acquire a picture of the battlespace in real time

Concern has grown over the proliferation of NBC weapons and related delivery systems. The conflict between Iran and Iraq and the Gulf War highlighted the danger posed by long-range missiles and hinted at this new threat. A national intelligence estimate issued in 1995, *Emerging Missile Threats to North America during the Next Fifteen Years*, posed relatively benign threats. It was discredited by the Rumsfeld Commission Report and the North Korean test of the Taepo-Dong missile in 1998. The sarin attack in the Tokyo subway in 1995, Indian and Pakistani tests of nuclear weapons in 1998, the end of U.N. inspections in Iraq, and the terrorist attacks on 9/11 have turned weapons of mass destruction (WMD) into a salient danger. In a report to Congress, the Central Intelligence Agency identified nine states that were developing or seeking to acquire such weapons. According to the Nuclear Policy Review, Libya, Iran, Iraq, North Korea, and Syria could be involved in a nuclear contingency. Various nonstate actors and terrorist groups such as al Qaeda, which are reportedly seeking NBC and radiological weapons, also are depicted as posing a serious threat to the United States. By contrast, the review does not characterize Russia as an immediate or potential concern to national security.

Recent trends present a challenge. On one hand, there is a strategic capability optimized for a danger that no longer exists and is considered the stumbling block in Russian-American relations. On the other, failures in nonproliferation confront planners with relatively small-scale threats that could become serious problems with little warning. Although the Armed Forces may confront an enemy willing to use NBC weapons,

Destroying Pershing II missiles in 1989.

DOD (Jose Lopez, Jr.)

the revolution in military affairs provides ways of employing conventional weapons for missions once reserved for nuclear forces.

The End of MAD

The Nuclear Posture Review and the Quadrennial Defense Review indicate that mutual assured destruction is not an acceptable basis for a strategic relationship. According to the former review, the United States "will no longer plan, size, or sustain its forces as though Russia presented merely a smaller version of the threat posed by the Soviet Union." In other words, because Russian nuclear arms are seen as a waning threat, deterrence will no longer dominate nuclear doctrine and targeting.

Although the current administration has not articulated a clear plan to transform strategic relations, policy changes are creating a new bilateral framework. Washington took the initiative by announcing a shift in nuclear doctrine, negotiating strategic force reductions, and introducing confidence-building measures that were intended to reduce tension and foster relations. Viewed in this light, withdrawing from the Antiballistic Missile Treaty becomes a positive step because it delivered a lethal shock to an outdated strategic framework. As the United States has repeatedly noted, the treaty stood in the way of missile defense as well as more cooperative relations with Moscow. The agreement signed by Presidents George Bush and Vladimir Putin in May 2002 is part of this new framework. Though the treaty limits deployed nuclear warheads to a maximum of 2,200 by 2012, it is more of a political document than a vehicle for arms control and strategic stability. The treaty reflects changes in force structure discussed in the Nuclear Policy Review and fulfilled Russian requirements for concrete evidence of this new partnership.

In fact, bilateralism was helped by pragmatism. By declaring peace, Bush and Putin have undermined the strategic rationale for sustaining the military, institutional, and diplomatic status quo. The United States made it difficult for Russia to assume a Cold War approach because it is willing to reciprocate. Putin found it possible to live with a limited ABM system in return for a U.S. nuclear arsenal reduced to Russian levels, which are based not on doctrine but on a weak economy. The American approach challenges traditional arms control and disarmament policies. Many treaties may become obsolete as bilateral relations improve. Cooperative efforts to foster peace, reduce forces, and safeguard materials do not pose a danger to other nations and need not be codified by treaties to ensure a stable world order.

The New Triad

The Nuclear Posture Review offers a pathway toward a new strategic triad that is aided by enhanced command and control and intelligence systems with offensive strike systems (nuclear and nonnuclear), defenses (active and passive), and a revitalized infrastructure. It assumed that nuclear weapons are only one of the capabilities that can address threats from proliferation of NBC weapons and ballistic missiles. This triad represents a departure in strategic doctrine, with deterrence, defense, and counterforce acknowledged as components. It can be best supported by a new force structure, although the concepts and planning for this advance remain undefined.

advanced command, control, and intelligence will integrate the triad, facilitating flexible operations

The new triad is intended to integrate capabilities (like missile defense), nuclear weapons, and nonnuclear strike forces into a seamless web

DOD (Helene C. Stikkel)

Briefing Nuclear Posture Review.

to assure allies and friends, dissuade potential enemies from mounting military challenges against the United States, deter enemies, and fight and win wars when deterrence fails. The Nuclear Posture Review notes that strike elements:

can provide greater flexibility in the design and conduct of military campaigns to defeat opponents decisively. Non-nuclear strike capabilities may be particularly useful to limit collateral damage and conflict escalation. NPR emphasizes technology as a substitute for nuclear forces that are withdrawn from service. Global real-time command and control and reconnaissance capabilities will take on greater importance in the new strategic triad. Nuclear weapons could be employed against targets able to withstand nonnuclear attack (for example, deep underground bunkers or bio-weapons facilities).

Advanced command, control, and intelligence will integrate the triad, facilitating flexible operations. The new strategic triad will rely on adaptive planning to meet emerging threats and contingencies. Emphasis on adaptive planning differs from the traditional way of developing the nuclear war plan—the single integrated operations plan—which was a deliberate process that often took months or even years to generate a finite number of options for consideration by the President as Commander in Chief.

Administration officials suggest that the new triad would allow reductions in operational nuclear forces from current START I levels of approximately 6,000 warheads for each country. The Treaty of Moscow in May 2002 made a reality of these levels when the signatories agreed to reduce strategic warheads to between 1,700 and 2,200 by 2012. Reductions in the U.S. arsenal will result from retiring MX Peacekeeper ICBMs (which began in 2002), removing four Trident submarines from strategic duty, and eliminating the requirement that B–1 bombers have nuclear capabilities. The administration will maintain a response force (sometimes known as a reserve force) of warheads that could be brought back into service. Planners probably have not finalized the size of this force, but in all likelihood it will number in the thousands. Both the Clinton and Bush administrations have maintained that it makes sense to count only warheads that either are deployed or can be available for use in days. By contrast, the response force would become available only after an extended regeneration and redeployment, which could take months or years.

The reduction in warheads will be accompanied by the development of new capabilities. The centerpiece will be missile defense, a multilayered protection against accidental launches or relatively limited strikes. No longer constrained by treaty, the United States is building on work initiated more than a decade ago. The current program includes boost-phase interceptors that attack ballistic missiles over enemy territory. There is special interest in the airborne laser, a speed-of-light directed energy weapon, and research on sea, air, and space-based boost phase systems to defeat missiles in the highly visible and vulnerable initial stage of flight. The plan enhances the mid-course, ground-based interceptor program with an expanded testbed. Additional support for the advanced Patriot missile will bolster terminal and point defense. This system is intended to protect land forces against cruise and tactical ballistic missile attack. The Pentagon also appears interested in a mobile tactical high-energy laser, which will

305th Communication Squadron (Scott H. Spitzer)

Unloading weapon from C–141.

provide ground forces with a directed energy weapon to counter rockets, cruise missiles, and artillery and mortar munitions.

The new triad highlights profound changes in strategic doctrine. First, it makes clear that deterring an all-out nuclear war with Russia is no longer a feature of war plans. Policymakers believe that to be an extremely remote possibility. Second, the triad embodies an effort to increase the credibility of strategic deterrent threats by increasing available options. The old triad was intended to pose a massive response to nuclear attack, while the reconfigured triad guarantees an appropriate way to respond to other forms of aggression, thereby bolstering deterrence. Third, the new concept sidesteps bureaucratic resistance to reconfiguring longstanding doctrine—the sanctity of the old triad and focus on assuring a massive response under any circumstances. This approach paves the way for further reductions in U.S. strategic nuclear forces.

Proliferation, Counterforce, and War

Although there is little doubt that the United States wants to eliminate nuclear deterrence as the basis for a strategic relationship with Russia, it is clear that the Nuclear Posture Review is not a blueprint for disarmament. But reducing operational warheads, deploying missile defenses, shifting to adaptive nuclear planning, and developing conventional precision-strike capabilities suggest a new era in strategic thinking and the relationship among nuclear weapons, deterrence, and war. The review identifies new targeting priorities for nuclear weapons: hardened facilities for command centers, underground facilities associated with NBC weapons, and mobile targets, such as NBC-armed missiles. It cites some 1,400 underground sites around the world that require targeting because conventional weapons cannot destroy them. Thus there is a need to develop an earth-penetrating capability to place these targets at risk.

The review calls for greater yield flexibility for both stockpiled weapons and warheads that reduce collateral damage. By identifying new targets and missions for nuclear weapons, it would appear that the United States must design and build arms—a process that was made difficult by the moratorium on testing. Given the unlikelihood that the moratorium would be abandoned under present circumstances, the way to overcome this basic inconsistency in the policies and capabilities advocated by the review is unclear.

Precision-guided weapons are clearly the preferred option for preemptive attacks against WMD infrastructure and delivery systems. Although it is difficult to justify employing nuclear weapons in order to prevent their use by an enemy, the arsenal provides escalation dominance. U.S. nuclear superiority makes doing nothing and being disarmed by a conventional counterforce attack the only rational response available to an enemy.

A range of nuclear options makes it more likely that an enemy with a small WMD arsenal will lose rather than employ NBC capabilities. And using such weapons might generate a nuclear response by the United States, a perception that reduces incentives for initial escalation. Theater and national missile defenses backstop conventional counterforce attacks by destroying incoming warheads. This is a form of nuclear warfighting and troublingly is not merely hypothetical. It has played out repeatedly in the case of Iraq, though many observers fail to pay attention to preventive war in counterproliferation strategy.

missile defenses backstop conventional counterforce attacks by destroying incoming warheads

The message for both state and nonstate actors seeking WMD is unambiguous—America accepts that it cannot prevent proliferation. Instead, it is preparing to target nuclear, biological, and chemical arsenals with conventional and, if necessary, nuclear forces. Preemptive attack has not been ruled out. The President announced at West Point in June 2002 that U.S. security "will require all Americans to be forward-looking and resolute, to be ready for preemptive action when necessary to defend our liberty and to defend our lives."[2]

Warfighting Issues

While the Nuclear Posture Review makes interesting reading, its implementation falls on the warfighter. Because of internal inconsistencies, some challenges may take years to resolve. For example, there is a mismatch between force structure and the new missions given to nuclear weapons. The review proposes that the weapons be used to hold at risk hardened underground bunkers containing WMD or command and control facilities. Yet there are no nuclear weapons in the arsenal that are optimized to meet this requirement, although there are plans to modify the B–61 gravity bomb for earth penetration. And if enemies simply decide to dig deeper, the length of time that modified B–61s can hold this target set at risk is uncertain. The force structure must be overhauled to meet new targeting needs. This change will require reviewing nuclear programs, retiring old systems, and fielding new weapons.

Launching ICBM from Vandenberg Air Force Base.

U.S. Air Force (Amanda M. Edwards)

Conversely, while the Nuclear Posture Review proposed greater reliance on conventional weapons to perform strategic missions, the process of operationalizing this concept is ill defined. Increased reliance on conventional munitions as a substitute for nuclear weapons calls for a new targeting methodology, which will require criteria for targeting. Doctrine must be developed for substituting conventional weapons to strike targets once covered by nuclear weapons. Moreover, varied conventional munitions must be designed, built, and integrated into the force structure.

Another targeting issue flows from the reduction in nuclear force levels. Fewer warheads translate into a reduced number of targets that can be struck by nuclear weapons. Redundancy in coverage has played an important role in counterforce strategy. But making serious reductions in arsenals could force the United States to confront nuclear scarcity: by definition counterforce could become primarily a mission for conventional weapons, while nuclear weapons are held in reserve for countervalue missions. The new threat environment, however, suggests that nuclear weapons might be more in demand, not less—to hold hardened underground facilities at risk.

U.S. Marine Corps (I.M. Gilbert)

M93A1 NBC reconnaissance system.

Conventional counterforce, under such circumstances, could be extremely demanding in terms of force structure, doctrine, and operations.

Although assigning forces to particular targets is challenging, there is a broader mismatch between the nuclear force structure and the international environment. What are the benefits of the D–5 SLBM or Minuteman III against al Qaeda or other transnational/terrorist threats? Would the United States contemplate using the Minuteman III against WMD sites? This imbalance in explosive yield and targets to hold at risk is a major challenge that takes on greater urgency given emerging doctrine, which emphasizes either preemptive strikes or war to check such threats. But developing a new generation of nuclear weapons to match this threat will be difficult as long as the United States honors a moratorium on testing.

There is also a mismatch between calls for a new generation of nuclear weapons and the ability of the nuclear infrastructure to meet that requirement. While the Nuclear Posture Review draws attention to the deterioration of the infrastructure, scientists who designed the weapons are leaving the scene. The source of a new generation of scientists to design weapons to respond to future threats is unclear. And even if scientists are found, it is uncertain how they will design, construct, and certify weapons, particularly low-yield and earth penetrating systems, without resuming nuclear tests.

Another major issue facing nuclear planners is the integration of offensive and defensive components of the strategic deterrent. The Pentagon is entering uncharted waters, and planners will have to establish a command and control infrastructure for the components of the new triad and determine mechanisms for these command relationships.

The Nuclear Posture Review represents a departure in thinking about deterrence. First, it abandons mutual assured destruction as the basis of the Russian-American strategic relationship and eliminates Russia as the benchmark for sizing nuclear forces. Second, it seeks to substitute conventional for nuclear capabilities as a strategic deterrent; the objective in the past was finding ways to combine conventional and nuclear force structures to function in a mutually supportive way to bolster conventional and nuclear deterrence. Third, the integration of offense and defense to bolster deterrence by denial is a departure, even if mechanisms and organizations to integrate these forces are still on the drawing board.

Despite the critics, the paradox of the review is that while it appears to make nuclear use more likely, it reflects the practice of nonuse that emerged after World War II. Factors other than efficiency or military utility shape policy on weak states with NBC weapons. The United States could have addressed proliferation and long-range delivery systems as a simple threat. It could have stated that any use of WMD, conventional strike, or unconventional attack would be met by a massive use of nuclear weapons. Instead, planners are searching for options to deter and defeat WMD-armed enemies with far less force than an all-out nuclear attack.

The problems of implementing the Nuclear Posture Review and operationalizing concepts in that document will eventually reach warfighters. This is a sobering challenge that will require decades to meet. But by destroying the paradigm that informed nuclear strategy in the Cold War, the review provides an opportunity to develop nuclear strategy for the 21st century. **JFQ**

NOTES

[1] Excerpts from the classified version of the report were published in *The New York Times* and *Los Angeles Times*. Most of the text is posted at http://globalsecurity.org/wmd/library/policy/dod/npr.htm. This cite is taken from the executive summary released by the Department of Defense. Other quotes come from the global security Web site, although the authors have no way of confirming their authenticity.

[2] Remarks by the President at the U.S. Military Academy on June 1, 2002 (Washington: The White House, June 1, 2002).

PSYOP unit patrolling Afghan village.

Fleet Combat Camera, Atlantic (Eric Lippman)

Army SOF in Afghanistan

Learning the Right Lessons

By FRANK L. JONES

The role of Special Operations Forces (SOF) in Afghanistan is currently being scrutinized for lessons on fighting the global war on terrorism. Initial assessments suggest that coordination between land and air forces signals a revolution in military affairs and perhaps a recipe for defeating terrorists. Some contend that these lessons will become the basis for military transformation and an important element in future strategic planning.

There are lessons to be learned—the challenge is identifying the right ones. Some might conclude that Afghanistan offered prescriptions for combating terrorism or shaping conventional warfare. This idea stems from the success of special reconnaissance, which aided precision air strikes and direct action missions, but neglects unconventional warfare. In other words, leaders might seek to conventionalize future conflicts. Unconventional warfare capabilities were essential in routing Taliban forces and al Qaeda and will be crucial in defeating enemies elsewhere.

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Hunting for weapons in Afghanistan.

55th Signal Company (Todd M. Roy)

Unconventional Warfare

It is prudent to reexamine unconventional warfare as the Armed Forces begin to wrestle with military transformation and wage a global war on terrorism. While the term *unconventional warfare* has found its way into various military lexicons for decades, Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines it as:

understanding asymmetric warfare leads to the view that time horizons are undergoing change

> *. . . military and paramilitary operations, normally of long duration, predominantly conducted by indigenous or surrogate forces who are organized, trained, equipped, supported, and directed in varying degrees by an external source. It includes guerrilla warfare and often direct offensive, low visibility, covert, or clandestine operations, as well as the indirect activities of subversion, sabotage, intelligence gathering, and escape and evasion.*

Unconventional warfare is often regarded as synonymous with guerrilla warfare, thereby obscuring its role in counterterrorism. This ignores the fact that it seeks political ends which affect the stability of nations. Unconventional warfare is a type of political and socioeconomic conflict with psychological elements. Moreover, although they can be protracted, unconventional wars are cyclical in nature. Variations in intensity may not equate to holding territory or imposing military government, which are associated with sustaining forces on the ground for extended periods. Understanding asymmetric warfare leads to the view that time horizons are undergoing change. Events in the last decade enabled protagonists to claim victory by retaining power. Nonetheless, unconventional warfare is an accurate term of art, a form of conflict for which Special Operations Forces are uniquely qualified and must maintain a high level of readiness.

Within the Army, Special Forces claim unconventional warfare as their primary mission. The international environment the Nation is likely to face over the next ten to twenty years will remain a gray area between political conflict and total war. Under such conditions nonstate actors could threaten stability. This conclusion is consistent with the findings of the intelligence community. Testifying before Congress, the director of the Defense Intelligence Agency stated: "The 1990s were a time of transition and turmoil as familiar Cold War issues, precepts, structures, and strategies gave way to new security paradigms. . . . I expect the next ten to fifteen years to be at least as turbulent, if not more so."[1]

Technological and information-age innovations can be used to produce weapons of mass destruction and manipulate financial markets. Further, globalization may run counter to cultural norms and national impulses and result in enmity. In addition, transnational actors like terrorists can undermine sovereignty by operating across frontiers and establishing networks for support. There is also a proliferation of dual-use and military technology. Other factors include disaffected individuals and groups as well as global demographic trends that can result in social stratification, which breeds resentment and hostility. Unconventional warfare can succeed in this environment because it can enable weaker parties to take on stronger ones.

If one can perform tasks associated with unconventional warfare—the most demanding mission conducted by Special Forces—other SOF missions (such as special reconnaissance and direct action) can be conducted successfully. According to this view, unconventional warfare as defined traditionally proves so demanding and comprehensive that other missions are subsumed under it. The skills required for unconventional war are applicable across the board, from military operations other than war to high intensity conflicts. Special operations missions can be mounted in situations where a small force is required because of the sensitivities to operational and strategic missions in support of joint campaign plans during wartime.

Strategic Context

National security strategy articulates American policies as well as interests and objectives around the globe. It also recognizes threats and challenges. Two aspects of protecting interests

Fleet Combat Camera Group, Atlantic (Michael Sandberg)

Loading leaflet dispenser.

and attaining objectives crystallized after 9/11, and both are related to unconventional warfare. First, potential enemies fall into two major categories: nations with traditional forces and nontraditional or nonstate actors that resort to terrorism or asymmetrical warfare. Both sorts of threats are less likely today to engage in force-on-force confrontations. Instead, they may resort to asymmetric or asynchronous strategies to inflict damage on friendly forces and undermine national will, exploiting ethical constraints as well as the obsession with declared endstates.

The second aspect is the interagency dimension of conflict. The military has learned over the last decade through peace operations and humanitarian assistance that it is no longer the only instrument of national security employed for these missions. It must deal with civilian agencies, foreign governments and militaries, nongovernmental and international organizations, and other actors during and after a conflict. Afghanistan called for extensive coordination between Special Forces and paramilitary assets from the Central Intelligence Agency. Both considerations make Special Operations Forces not only the units of choice for the future but demand an understanding of unconventional warfare as an essential component of national security strategy.

Afghanistan may relegate SOF assets to roles that undermine their unconventional warfare capability

Instruments of Unconventional Warfare

Special operators possess skills for unconventional warfare which are politico-military in nature. They leave a small footprint and have the adaptability to operate without a huge logistic system. They can act with speed and surprise. They have unique abilities to work with surrogate and indigenous forces, including foreign languages, regional expertise, and interpersonal skills, particularly in teaching military tactics and techniques.

Nonetheless, other means complement these competencies and are valuable in conducting unconventional warfare. One is psychological operations (PSYOP), the planned use of communications to influence the attitudes of foreign target audiences to achieve strategic objectives.

Another complementary activity is civil affairs. In the last decade, civil affairs units have repeatedly been called on to support humanitarian assistance and peace operations. Skills honed in these operations are transferable to unconventional warfare. Although structured primarily for theater warfare, civil affairs teams can help local governments and conduct civic action projects, a necessary component in securing support from the local populace in an unconventional warfare environment. They can restore basic services after a conflict like Afghanistan, where civil affairs units are surveying the needs of local people so international organizations can provide aid. They can also assist new governments and inexperienced leaders in public administration, thus molding the post-conflict situation. Such efforts are directed toward promoting conciliation with important levels of society to maintain stability.

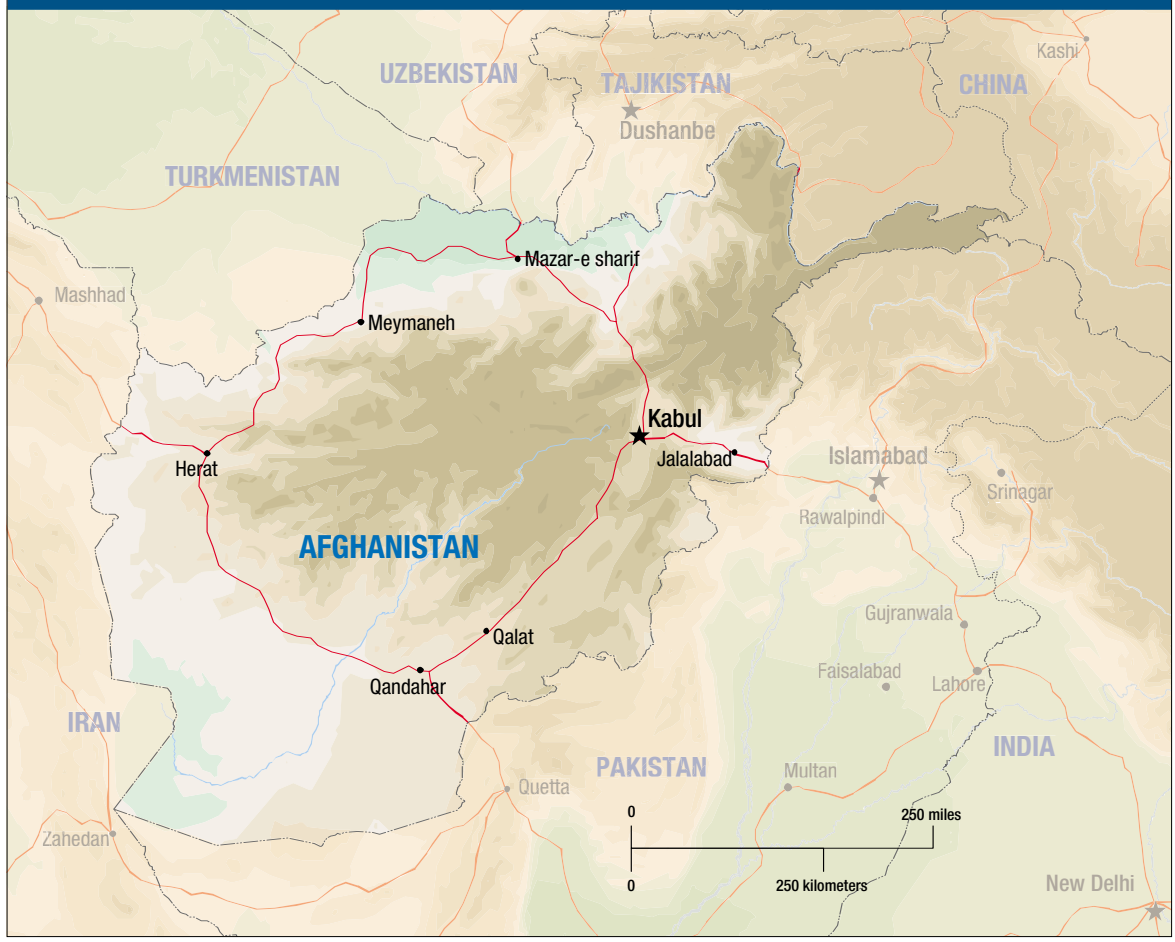
These skills are also required in the global war on terrorism. Unfortunately, preliminary lessons gleaned from Afghanistan may narrow their use to the application of technology in future warfare or relegate SOF assets to roles that undermine their unconventional warfare capability.

Future Operations

As previously noted, the future of unconventional warfare was debated prior to 9/11. In view of the success of Special Operations Forces in Afghanistan and its influence on perceptions of policymakers and unified commanders as a capability for combating terrorism, the demand for such assets is growing dramatically. In turning to this resource, strategic leaders must examine the part it should play in troubled regions of the world.

A number of considerations which bear on the experience of Special Operations Forces in Afghanistan have implications for missions and force structure. Some leaders may assume that special operators are only effective in combating terrorism when performing limited conventional support missions as part of combined arms teams. This view has a long history in defense circles,

Afghanistan and Its Neighbors



where synchronization is the accepted norm. Senior civilian officials and military officers hew to this rule out of fear that Special Operations Forces may become either too independent or eclipse conventional forces. Yet unconventional operations certainly complement conventional operations and must support joint planning when practicable. While the effects of SOF assets may not be as precise as armored formations or as predictable as deliberate attack, the benefits of employing them in a limited capacity far outweigh the issue of control, because less flexibility seriously erodes their capabilities. This approach has often been disregarded in the past because of the need for unconventional capabilities. However, it is a lesson that senior leaders seem willing to learn repeatedly.

Another consideration may be increasing the size or expanding the range of SOF assets. There has been speculation in the media that airborne units could be transferred to U.S. Special Operations Command. Such proposals ignore the facts that make special operators successful. They could also adulterate the quality of the force and reorient it from unconventional warfare to a form of elite infantry, which it is not.

Third, aside from the belief that success in Afghanistan is a model for other applications, decisionmakers may want to use SOF assets to combat terrorism in ill-advised ways. They may seek to deploy them with other agencies, such as intelligence and law enforcement, to form joint interagency task forces. Although SOF personnel can work in an interagency environment, they would be reduced to staff responsibilities of marginal utility, given that such task forces would be focused on intelligence analysis, interrogating detainees, and freezing assets. There are fewer than 30,000 SOF personnel in the Army, many within the Reserve components such as civil affairs and psychological operations units. Interagency assignment is not a judicious use of scarce assets.

Another approach would be using SOF assets to train foreign armies in counterterrorism, which

is the only form of U.S. presence some countries will tolerate. Though worthwhile, treating counterterrorism as a one-dimensional mission, as seems to be the situation in the Philippines, may be a mistake. Terrorism is not an end in itself, but rather a technique to create fear and destabilize regimes. Groups such as al Qaeda seek to overthrow governments and are insurgent. This sort of threat is reactionary-traditionalist or spiritual in nature. It tries to restore an arcane political order, which is romanticized. Terrorism is a political tool that is used because no other instrument is available or the situation has not matured to the point where guerrilla warfare is feasible.

Insurgency is fostered by popular resentment of authority. This disaffection gives rise to resistance or violence against existing regimes. Therefore, foreign militaries must be trained not only in civil disturbances and hostage rescue, but also counterinsurgency tactics, techniques, and procedures. For example, parts of the Philippines are becoming unstable and Muslim extremist groups are expanding. Meeting this challenge will require more than training local forces, which are identified with social inequality and a failed justice system. Insurgents survive because of weak control by national authorities and sympathetic populations. Manila requires better tools to counter insurgents, and Washington—calling on civilian and military capabilities—can assist when not limited to teaching hostage rescue techniques.

Fast rope training in Afghanistan.

55th Signal Company (Robert Hyatt)

On the Right Path

Underpinning special operations in Afghanistan was the concept of engagement—that is, enhancing national security through systematic and integrated global leadership to influence state or nonstate actors. SOF personnel are effective because of area expertise, which is honed over many years. They routinely deploy overseas and develop close relationships with foreign counterparts. For instance, Uzbekistani support of operations in Afghanistan was facilitated by the earlier visit of a Special Forces training team. SOF political-military efforts promoted long-term objectives. Such an approach must be sustained not only for the sake of counterterrorism, but to ensure that Special Operations Forces are capable of conducting unconventional warfare.

unconventional warfare must not be limited to hot wars or large-scale operations

Moreover, SOF assets are global scouts. Some of their critical work is performed prior to a crisis. Such efforts, often in the context of foreign internal defense, are linked to proper conduct in dealing with civilians where insurgency is likely.[2] SOF personnel are models of proper behavior among local populations and do not create enemy sympathizers. Such conduct also aids in collecting intelligence. In some nations, relationships may include helping form local militias or civilian defense forces, thus strengthening communities as well as respect for human rights. This fact was recognized by policymakers as an emerging post-Cold War role. If a crisis erupts while special operators are deployed, they provide instant presence for unified commanders. In addition, both psychological operations and civil affairs on the strategic and tactical levels must be emphasized since they clarify foreign policy objectives through favorable impressions of U.S. military activity in a region.

Unconventional warfare also puts demands on the operational skills of both civilian and military organizations. DOD must augment SOF missions in those areas plagued by insurgency. Emphasis must be placed on agricultural and economic efforts sponsored by the U.S. Agency for International Development—objectives consistent with the global alliance, which is the model for the 21st century. Such development is crucial to U.S. strategic interests. Unconventional

Searching for hidden arms cache.

55th Signal Company (Fred Gurwell)

Civil Affairs personnel with village elders.

55th Signal Company (Marshall Emerson)

warfare must not be limited to hot wars or large-scale operations. A judicious admixture of training and development may lead to a lasting victory without dramatic headlines.

Next, the military must analyze irregular and revolutionary warfare, not only by revisiting past conflicts but also in projecting future confrontations, which include political, economic, and social views as well as cultural and religious biases of potential enemies. The importance of area expertise cannot be overestimated. Understanding operational environments must form part of training for SOF personnel, such as intelligence analysts and operatives. Equally significant are the strengths and weaknesses of allies and friends. Anecdotal evidence from Afghanistan suggests that SOF personnel must be proficient in several languages within their area of operations.

DOD must consider innovations for use in various environments, such as urban warfare, and the means to accomplish missions, from nonlethal weaponry to sophisticated communication equipment. There must also be an appraisal of SOF capabilities for the future.

A counterterrorism or counterinsurgency strategy must integrate military and information instruments of national power, including public diplomacy and psychological operations as well as civic action conducted. The lessons of the Vietnam War are pertinent. Interagency relations must be enhanced to offset the lack of an integrated counterinsurgency strategy and national mechanism to coordinate it. This effort must focus on the Department of State (especially public diplomacy); the intelligence community, because human intelligence, counterintelligence, and area expertise are critical (SOF personnel who return from overseas are a trove of information); and the U.S. Agency for International Development, which must act as a full partner in working with local populations.

Even superpowers can lose asymmetric wars. The ideal response to such conflicts requires preparing for engagements despite technological advantages. Committing forces may cause public opinion to become a center of gravity, a vulnerability that insurgents exploit. In addition, when forces are committed, counterinsurgency missions must be entrusted to those especially trained and equipped for them. Winning hearts

Checking for munitions outside Kabul.

1st Combat Camera Squadron (Bethann Hunt)

Fleet Combat Camera, Atlantic (Michael Sandberg)

Preparing PSYOP leaflets.

and minds is integral to defeating insurgency, an axiom initially invoked during the emergency in Malaya—the model of a successful counterinsurgency campaign.[3]

Finally, emphasizing one mission over another does not come without friction. Allocating resources is difficult, and upgrading unconventional warfare will require personnel as well as resources that are not included in the current budget. U.S. Special Operations Command must reexamine planning and budgeting processes to determine if the unconventional warfare mission, in its broadest sense, is amply supported.

The successes of military operations in Afghanistan are being jeopardized by misreading them. Although Special Operations Forces are credited with defeating Taliban and al Qaeda forces, too much emphasis can be put on coordinating ground and air attacks while recruiting anti-Taliban fighters is underestimated. The latter capacity resulted from employing SOF assets in unconventional warfare. Comprehending this subtlety will be critical in future operations. While there are not many Afghanistans in the world, potential alliances abound. The rise of insurgent and irredentist movements (sometimes equated with terrorist initiatives exclusively), coupled with asymmetric threats, demands a strategic vision for unconventional warfare. JFQ

NOTES

[1] Thomas R. Wilson, "Global Threats and Challenges," statement before the Senate Armed Services Committee, March 19, 2002, http://www.dia.mil/Public/Press/statement04.html.

[2] Anthony J. Joes, *America and Guerilla Warfare* (Lexington, Ky.: University of Kentucky Press, 2000), pp. 330–32.

[3] Michael Howard, "Mistake to Declare This a War," *RUSI Journal*, vol. 46, no. 6, (December 2001), p. 2.

Airmen tending F–15E, Nellis Air Force Base.

Briefing Millennium Challenge.

1st Combat Camera Squadron (Lisa Zunzanyika)

1st Combat Camera Squadron (Aaron D. Allmon II)

MILLENNIUM CHALLENGE 2002

Setting the Mark

By GROVER E. MYERS

New enemies with old grudges are using innovative ways to challenge American leadership around the world. To meet this threat, the Secretary of Defense has given the task of transforming the military to U.S. Joint Forces Command (JFCOM). Millennium Challenge, conducted in the summer of 2002, was the pinnacle of this effort thus far. JFCOM believes this multilevel exercise was successful enough to warrant immediate implementation of some of its recommendations.

Equally important as decisions on change for those who must confront emerging enemies are the lessons of recent operations and deliberate experimentation. New adversaries are not likely to wait as we adapt to fresh tactics and threats in the traditional methodical Cold War fashion. And the lessons from transformational experiments need

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to be immediately recognized and incorporated into plans and, more importantly, into doctrine. As one observer noted, "Experience in the private sector demonstrates that successful corporations do not plan to transform in the distant future: they transform constantly."[1]

The Challenge

The United States finds itself in a unique historical position that is both highly perilous and full of opportunities. With the end of the Cold War it is the most powerful nation on earth. After some forty years of superpower confrontation and a nuclear standoff, many Americans believe that the country has earned a respite from the burden of global leadership. But its role in the world presents new challenges to national interests.

Technological advances offer unprecedented capabilities to friendly and enemy forces alike. Political, economic, cultural, and other pressures in the post-colonial, post-Cold War environment make conflict more likely. Globalization seeds unrest in distant lands that is potentially damaging to national interests. The possible consequences of future conflict were brought home when the United States came under terrorist attack in September 2001.

for the force to carry out effects-based action, it must have detailed knowledge of an enemy

The latest defense planning guidance acknowledged new challenges and recognized that current forces and operational concepts designed for symmetrical warfare against similarly armed enemies were inadequate. Thus it tasked JFCOM to develop joint operational concepts to support military transformation while exploiting asymmetric advantages and emerging joint capabilities.

A Response

The rapid decisive operations (RDO) concept developed by JFCOM responds to defense planning guidance and to the new operational realities driving it. Fostered by the requirement to meet a wider range of enemy capabilities, this concept presents new ideas on achieving national objectives and is centered on effects-based methods and processes. It describes a way to apply military capabilities in conjunction with the other instruments of national power—diplomatic, informational, and economic—in a campaign centered on the effects required to achieve national objectives. Unlike traditional military operations, an effects-based campaign does not focus primarily on attrition of an enemy, although that option remains, but on affecting the will and ability of opposing leaders to resist U.S. objectives—on creating desired actions or reactions or even an inability to act at all. The goal is to apply the right set of capabilities to control the circumstances and the enemy and conclude conflicts as quickly and resolutely as possible at minimum cost in lives and treasure.

Since JFCOM was assigned the mission to lead joint experimentation, the command has worked a robust program of experimentation and wargames to initiate and develop key warfighting concepts. For example, Unified Vision, an experiment conducted in May 2001, assessed the value added of a standing joint force headquarters in a rapid decisive operation. From its findings and insights, the RDO concept was further developed through a series of smaller limited objective experiments so that a mature concept with supporting systems, procedures, and tools was ready for rigorous analysis when Millennium Challenge was conducted.

Paramount in rapid decisive operations is the idea that one must think differently about planning and executing military operations. That is the overarching theme of JFCOM concept development and experimental activity, which has emphasized a fully networked joint force with a superior, knowledge-focused joint organization ready to implement effects-based operations in rapid decisive operations. Along the way, the command has used input from the field and fleet in the form of findings from experimentation and wargaming.

The RDO concept emerged from four characteristics of future joint operations: coherently joint, fully networked, effects-based, and knowledge centric. Together they provide a framework for examining joint concepts and exploring capabilities—an approach to thinking differently about military operations. Moreover, since they are closely interrelated, these characteristics must not be viewed in isolation. For example, to be coherently joint means that all components of the force must be fully networked with integrated, collaborative command and control structures. And for the force to carry out effects-based action, it must have detailed knowledge of an enemy, itself, and the environment, thus being knowledge-centric.

Testing New Concepts

Millennium Challenge tested the RDO construct and the ability of the joint force to conduct such operations in this decade. It employed newly developed concepts and stressed them in the new world environment. The command mission was not only to demonstrate the ability to conduct rapid decisive operations, but to produce comprehensive recommendations as part of the

SEALs emerging from HH–60, Desert Rescue X.

1st Combat Camera Squadron (Aaron D. Allmon II)

JFCOM role as a leading agent for joint force transformation. The command has begun making recommendations based on more than two years of joint experimentation.

Millennium Challenge enabled JFCOM to develop specific recommendations to transform joint operations and provide a pathway for future experiments. It was the largest as well as the most comprehensive joint force experiment ever conducted. This $250 million undertaking was preceded by 23 workshops and 16 limited objective experiments. In addition, it facilitated the exploration of 11 joint service concepts, 27 joint initiatives, and 46 service initiatives, and also evaluated 22 warfighting issues based on concerns of combatant commanders. Some 13,500 personnel at 25 locations across the United States were involved in this experiment, which incorporated a rich mix of live and simulated forces, current and future capabilities, an aggressive and asymmetric opposing force, and a new federation of 42 models and simulations.

The RDO concept is not a stand-alone construct; it relies on component concepts to achieve its objectives. The most prominent concepts addressed during Millennium Challenge were effects-based operations, standing joint force headquarters, the collaborative information environment, the joint interagency coordination group, and operational net assessment.

Effects-based operations. Unlike traditional campaigns, an effects-based campaign is not primarily focused on attrition but rather on creating effects—desired enemy actions, reactions, or inabilities to act—that force compliance with national objectives. The goal is to apply the right set of capabilities that will conclude the conflict as quickly and resolutely as possible at minimum cost in lives and treasure. Effects-based operations provide a process for obtaining the desired strategic outcome through the precise application of all national capabilities—economic, information, and diplomatic as well as military. On the operational level of war, effects-based campaigning is concerned with controlling or influencing the behavior of a complex, adaptive enemy by creating specific conditions and disrupting its ability to adapt to those conditions in any way other than the desired outcome.

Effects-based operations are prefaced on understanding an enemy as a complex adaptive system and identifying the key nodes and links in that system where effects are to be concentrated. It also aims to achieve effects that cannot always be attained with weapons—political, information, and economic. It focuses the collective effects to take away what an enemy most values.

To the soldier on the ground, effects-based operations are transparent—what he does and

U.S. Army (Sara Wood)

Operating tactical satellite radio at Fort Erwin.

how he does it will change little; however application of its principles directly against enemy will and capability to resist mitigates the risks to that soldier. Its effectiveness rests on friendly advantages in new information technology and the knowledge of the enemy, oneself, and one's environment. Of all the emerging concepts, it best represents the idea of looking at things from a different perspective.

Standing joint force headquarters. Located within a combatant command, the standing joint force headquarters is a permanent command and control element that:

- operates and trains together on a daily basis, creating permanent, habitual working relationships
- participates in planning and executing the commander's long-term security cooperation program
- conducts operational net assessment and contingency planning for potential crises in the commander's area of responsibility
- is enabled by the collaborative information environment
- reduces ad hoc staff adaptation and augmentation in time of crisis.

Traditionally, task-specific headquarters have been organized and deployed only when a crisis has begun or political/senior military authorities identify a need. In such cases, a commander must then be identified and a staff assigned to manage the operation. Often the tasked headquarters is composed of representatives of only one service who are untrained in joint task force procedures. By contrast, a fully trained standing headquarters of 50 to 60 personnel from all services located in the regional commander's headquarters can begin much of the planning almost immediately and can be augmented as the situation requires.

JFCOM is convinced that standing joint force headquarters can provide faster stand-up of a joint task force headquarters during a crisis where every minute counts, and that once established the headquarters has a better awareness of the intent of a combatant commander and the operational situation. This approach also provides the organizational construct for applying the remaining concepts described below.

Collaborative information environment. Using newly available high-speed information connectivity and electronic collaborative tools, the collaborative information environment facilitates immediate information exchange among members of the joint force and its supporting and supported organizations. It contributes to achieving decision superiority by rapidly and simultaneously sharing information and ideas to all who need it, reducing planning times and enhancing operational effectiveness.

The environment used during Millennium Challenge was a command, control, and intelligence system that simultaneously linked commanders at many levels and locations and their sources of vital information both within and outside military channels. Collaborative information environment uses the global information grid as its information management and dissemination backbone, which will allow operational commanders to collaborate with supporting organizations wherever they are located. The operational net assessment and joint interagency coordination group concepts discussed below rely heavily on collaborative information environment in that each uses collaborative applications to permit supporting staffs, separated by geography and organizational boundaries, to develop products collectively.

Additionally, the new joint en route mission planning and rehearsal system-near term was integral to the collaborative information environment in Millennium Challenge. This command and control tool allowed the operational commander to continue to participate in the collaborative environment with his staff and subordinate commanders even while on the move at great distances from his headquarters.

Joint interagency coordination group. Both military leaders and civilian officials recognize the persistent shortfall in synchronizing military and agency efforts toward common goals. When the Nation undertakes operations to influence, deter,

or defeat an enemy, the Armed Forces are only one component. Achieving national goals is a cooperative endeavor involving many Federal agencies. The joint interagency coordination group provides civilian representatives to combatant commands and facilitates rapid information sharing across the interagency community. It fosters mutual understanding by developing collaborative day-to-day working relationships between civilian and military operational planners. In keeping with the intent of rapid decisive operations, this group allows theater commanders to bring all elements of national power to bear—harmonizing diplomatic, information, military, and economic activities within their areas of responsibility. These elements can best be applied together to rapidly result in the collapse of an enemy.

the joint interagency coordination group provides civilian representatives to combatant commands

Operational net assessment. Harnessing recent advances in intelligence, surveillance, and reconnaissance systems and procedures as well as in communications and information management, operational net assessment provides commanders with comprehensive analysis of the potential effects of both friendly and enemy actions. This study extends beyond traditional military means to provide a range of options that can decisively influence enemy will.

Operational net assessment relies on habitual, persistent, institutionalized collaboration and integration among as many concerned parties as possible (largely provided by the collaborative information environment). The intent is to leverage a wide variety of experts from multiple organizations to build a coherent knowledge base. This assessment links potential effects to critical leverage points within a political, economic, information, and military system and to a range of options necessary to achieve those effects.

Linking the Pieces

The central hypothesis tested in Millennium Challenge involved three concepts that will enlarge joint force capability to conduct a rapid decisive operation. If an enhanced joint headquarters is informed by an operational net assessment and employs effects-based operations that utilize the full range of national capabilities, the 2007 joint force will be able to conduct rapid decisive operations against a determined 2007 enemy.

The hypothesis can best be understood in terms of the desired outcome, which is achieved by gaining decision superiority over an enemy. Such decisions are based on altering the perceived environment of an enemy. That is effects-based thinking. Key is the difference between traditional objective-oriented operations, which are focused on destroying physical objectives, and effects-based operations, in which the cohesion of the environment, capability, and will of an enemy is attacked through full simultaneous integration of all aspects of national power.

The first understanding of the situation is the job of the operational net assessment—providing a full understanding of an enemy, the battlespace environment, and friendly resources as seen by an enemy. This type of insight is called a system-of-systems analysis.

Finally, it was recognized early on that the current process of managing the way the military views the world and the operational challenges it presents was not achieving the goal of decision superiority. The processes and formal relationships were out of date. The Armed Forces were still organized like Napoleonic armies while operating in a world of cyberwar.

An Assessment

Millennium Challenge was judged by most participants as a success in determining the ability to conduct rapid decisive operations in this decade and in rigorously analyzing component concepts. The central ideas presented earlier fall into two camps. The characterization of these positions—either *invest now* or *in need of refinement*—is determined by the readiness of a concept or initiative for implementation in the joint force. Several significant insights from this experiment call for immediate investment.

DOD should first select a common collaborative capability for an interim joint command and control tool; JFCOM, with support from unified commands, services, et al., should develop joint command, control, communications, computers, and intelligence (C^4I) architecture. Then the Joint Requirements Oversight Council should approve a base prototype incorporating both key enablers of a collaborative information environment and evolving concepts of operational net assessment and effects-based operations. Finally, a capability should be fielded to combatant commands; JFCOM should collaborate with the Office of the Secretary of Defense, Joint Staff, and unified commands to refine roles, responsibilities, business rules, and a reachback capability.

In addition, two main areas need refinement. JFCOM should revamp the concept of effects-based operations. The Joint Forces Staff College should be assigned to JFCOM and tasked with joint professional military education aligned with changing operational art. Moreover, the Defense Advanced Research Projects Agency, in concert with JFCOM, industry, other agencies, and

Changing the Conduct of Warfare and Conflict

Traditional Deconflicted Operations	Future Fully Integrated Joint Operations
Interoperable service-based	Integrated joint-based
Interagency coordination	Interagency integration
Complementary multinational	Coordinated multinational
Continuous information/data generation	Continuous actionable knowledge generation and management
Target effects	Effects-based
Platform-based	Networked
Engagement-centric	Effects-centric
Massive force application	Precise force application
Sequential and segmented	Simultaneous and parallel
Regional battlespace perspective	Global battlespace perspective
Contiguous (in contact)	Noncontiguous (not in contact)
Combat focus primarily threat-based	Combat focus on capabilities-based system of systems

headquarters, should develop enabling technologies to support the operational net assessment initiative. Work should begin on a prototype with the Office of the Secretary of Defense and combatant commands, and a DOD fusion/knowledge advantage capability should be created.

From these and other more detailed observations throughout the three-week event some conclusions can be drawn about near-term U.S. force capabilities and the RDO concept. The bottom line is that while there is more to be done, transformation to a force capable of achieving its objectives in the post-Cold War environment at any place any time seems to be on track.

experiments can enable JFCOM to capture emerging trends in the American way of war

Experiment Findings

Today the joint force cannot conduct rapid decisive operations across the entire force or on the scale desired. However, if the recommendations are implemented, it will be able to conduct them over the course of this decade.

Several combatant commands have already incorporated and are using concepts and tools developed for Millennium Challenge. Joint experimentation, training, and integration are moving the Armed Forces in the right direction—toward military transformation.

It is time to apply ideas derived from the JFCOM experimentation process to doctrinal prescriptions. In this context, and as defined in Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, doctrine is "Fundamental principles that guide the employment of forces of two or more services in coordinated action toward a common objective."

Advances that lead to change are not confined to the world of science and technology. It is often stated that developments in warfare stem from technological innovations such as the longbow, stirrup, machine gun, tank, stealth aircraft, and unmanned aerial vehicle. While *Joint Vision 2020* clearly acknowledges the role of technology in such advances, it states that it is not the sole driver of change within the Armed Forces. The document places greater importance on the "development of doctrine, organizations, training, and education, leaders and people."

It is not a coincidence that doctrine heads this list since it is an authoritative statement of the best way of doing business. It also drives education and training. Concepts such as rapid decisive operations represent much of the future of military doctrine. Ideas on better ways of doing things, properly developed, tested, sponsored, and presented, can become part of the driving paradigm of military might. Rapid decisive operations, standing joint force headquarters, and effects-based operations could be seen as the source of doctrine. They forward ideas that may eventually become part of the doctrinal construct.

Experiments such as Unified Vision and Millennium Challenge can enable JFCOM to capture emerging trends in the American way of war and present new constructs for operations. The accompanying figure depicts how command experiments on new concepts and effects-based operations might eventually change the nature of military operations to meet 21st century needs. These emerging trends have already fostered change in the way we view military operations and will result in far more in the next few years. But as of this writing, most do not yet have a conceptual foundation in joint doctrine; there is very little doctrinal description of their effects on how national goals are achieved.

Rapidly developing concepts such as effects-based operations, the interagency campaign, collaborative information environment, and the standing joint force headquarters are four examples of new national security concepts being developed across the diplomatic, information, and economic as well as military elements of national power. But it can be argued that for the military component, the level of interest and the time and energy spent on their development, test, and initial use in the field make them ideal candidates for near-term doctrinal review.

1st Combat Camera Squadron (John Houghton)

Marines patrolling, Millennium Challenge.

JFCOM is including a list of doctrine development issues in its formal recommendations for change in the wake of Millennium Challenge. For example, one recommendation suggests that the Joint Staff and JFCOM assess the impact of the concept of effects-based operations and the results of the experiment on joint publications and on the joint pub assessment and publication schedule. But this is no simple task, as any such analysis must consider the relationship between effects-based operations and the collaborative information environment, operational net assessment, standing joint force headquarters, and joint intelligence, surveillance, and reconnaissance concepts, which reinforce each other.

Moreover, Millennium Challenge revealed that standing joint force headquarters—formed in peacetime, organized to manage information and plan for contingencies in advance of events, and ready to deploy as crises escalate—significantly improves the readiness of combatant commands. They can provide up-front contingency planning and the ability to rapidly establish an operational joint task force headquarters that is battle ready as the first soldiers hit the ground. But achieving the full effectiveness of the headquarters requires it to incorporate the effects-based operations process through use of collaborative information environment and operational net assessment.

The question now becomes when a concept is ready for incorporation into doctrine. The obvious answer is when it has been thoroughly evaluated through test and experimentation. But even concepts being developed for use in the distant future may refine doctrine in the near term, as seen during Enduring Freedom when ideas such as effects-based operations and operational net assessment were applied to operations in Afghanistan. A JFCOM pamphlet entitled *Bridging the Gap Between Concepts and Doctrine* makes this point: "Even a concept focused on 2015 and based on matériel capabilities not yet available can contain process and organizational constructs that could improve today's operations." Such is the case, especially with effects-based operations and collaborative information environment, where the main thrust centers on changing thinking rather than building new systems.

Concepts are developed to solve pressing needs. Traditionally they have been validated by testing and experimentation, at times even in the cauldron of conflict. The emerging principles are then submitted to joint and service doctrine development authorities for review and eventual inclusion in doctrinal publications.

But converting proven ideas into viable prescriptions is a lengthy process. The life cycle of a doctrine publication from development through approval can take two years or more as parochial differences among the various parties are worked out. The publication is then assessed for revision after five years and the process begins again.

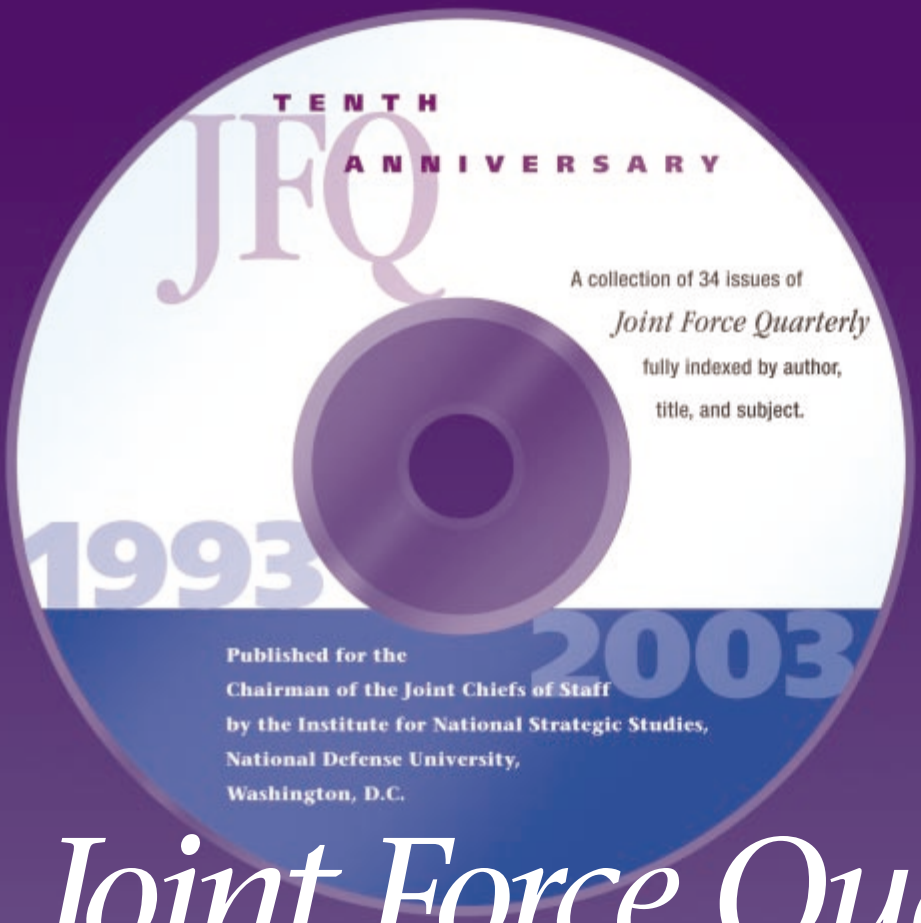
This approach to consensus management might have been acceptable during the Cold War, when basic strategic and doctrinal precepts rarely changed and the focus was on a confrontation in Western Europe similar to World War II. But since the fall of the Berlin Wall, the Armed Forces have experienced a tremendous expansion in military operations—Desert Storm, Deliberate Force, Allied Force, and Enduring Freedom—as well as relief and peacekeeping missions, each with its own set of circumstances and objectives. As a result, lessons are being learned faster than doctrine can be developed. The same phenomenon applies to new concepts being generated by the forms of warfare encountered in those operations.

The goals of military transformation will not be fully accomplished until joint doctrine takes related changes into account. Millennium Challenge made significant progress in validating several new concepts and paved the way for others. It established the initial mark for joint force transformation. Now the onus on the joint community is incorporating new concepts into doctrine in order to conduct true rapid decisive operations in 2007. The question is whether doctrinal development will be able to keep apace of change and meet that deadline. **JFQ**

NOTE

[1] Douglas A. Macgregor, "Resurrecting Transformation: A New Structure for Post-Industrial Warfare," *Defense Horizons,* no. 2 (September 2001), p. 1.

The Tenth Anniversary Collection



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A PROFESSIONAL MILITARY JOURNAL

The Military Uses of Space

How the United States develops the potential of space for civil, commercial, defense, and intelligence purposes will affect the Nation's security for decades to come.

America's interests in space are to:

- promote the peaceful use of space
- use the Nation's potential in space to support U.S. domestic, economic, diplomatic, and national security objectives
- develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

—from *The Report of the Commission to Assess United States National Security Space Management and Organization*

Atlas II AS rocket arriving at Vandenberg Air Force Base.

U.S. Air Force (Steve Schester)

National Security Space
Enabling Joint Warfighting

By PETER B. TEETS

Although less than fifty years have passed since man ventured into space, the constellations of satellites in orbit have fundamentally changed life on Earth. Moreover, the exploitation of space, like that of land, sea, and air, has often had an unrecognized impact on modern warfare.

This did not happen overnight. In the early stages of the space age, only a limited group of users on the most strategic level used the great majority of space capabilities, and those systems were highly classified. The recently declassified Corona program of the National Reconnaissance Office is an example of such a development.

Distinctions among military, national intelligence, civil, and commercial programs are being increasingly blurred and in some cases are virtually seamless. The same overhead imagery

The Honorable Peter B. Teets is Under Secretary of the Air Force and Director of the National Reconnaissance Office; previously he was president and chief operating officer of Lockheed Martin Corporation.

used by an analyst inside the beltway could be downloaded and exploited by a soldier in Afghanistan. The same global positioning system (GPS) satellites providing a navigation signal to fighters on patrol over Iraq could guide hikers in the Rockies or provide timing to an electric power grid.

Space capabilities are woven deeply into the fabric of modern society. Commerce relies on them for the swift flow of information and transactions, and the national security arena depends on them for joint warfighting and protection of the homeland. It is clearly within this context that the defense and intelligence communities are striving to provide the right space capabilities to meet present and future national security challenges.

Space Capabilities

The Armed Forces are currently waging a conflict across the spectrum of warfare. Operations range from defending against a variety of unpredictable threats against the homeland to thwarting aggression by projecting national power to the farthest reaches of the globe. At the same time, the capabilities, strengths, and exploitation of space have never been so pivotal to warfighting success. Without question, space assets form the backbone of the global information and intelligence networks that gather and disseminate data, coordinate efforts, guide forces and weapons, and assess results. They are key enablers of the precision warfare that not only reduces risk to American troops, but saves innocent lives by minimizing collateral damage.

Who would have predicted that aging B–52s could provide close air support with the help of precision targeting via satellite communications and global positioning? Or that Special Operations Forces mounted on horseback would download intelligence onto laptops via satellite or navigate by GPS devices? One can only begin to imagine the endless ways in which space will be critical to warfighters tomorrow. Space capabilities are no longer just nice to have—they are indispensable. It is against this backdrop of the ever-increasing importance of space, and the current war against new threats, that we find ourselves at an historic point in the way the Nation organizes and advances its national security space capabilities.

Space Imaging

Executive Agent

The Commission to Assess U.S. National Security Space Management and Organization recognized security dependencies on space, identified vulnerabilities in the space arena, and laid out a roadmap for improved organization and execution of the range of national security space activities. These included a separate four-star commander of Air Force Space Command (in addition to the combatant commander of the former U.S. Space Command), realignment of the Air Force Space and Missile Systems Center into Air Force Space Command, and combining acquisition milestone decision authority for all space systems with the responsibilities of the Under Secretary of the Air Force and the Director of the National Reconnaissance Office.

The Space Commission gave the Air Force a significant challenge in recommending that the service be the designated DOD executive agent for space, "with department-wide responsibility for planning, programming, and acquisition of space systems." This is certainly not a set of tasks that one service can accomplish. The Air Force is working with the Departments of the Army and Navy, defense agencies, joint warfighters, the intelligence community, and civil and commercial users to ensure a comprehensive approach to national security space stewardship. Unity of vision and execution is needed to fulfill the mission of ensuring strong and capable space systems for national security needs. In this age with its many requirements, competition for resources is high, and systems—especially space capabilities—are in demand by the widest spectrum of users. Success is virtually impossible without a true unity of effort among all stakeholders.

Baghdad in October 2002.

Space Imaging Middle East

Restoring Faith

The national security space team faces a number of challenges. One is to restore confidence in space acquisition programs. For various reasons recent problems have brought the credibility of the acquisition community into question in the minds of the defense leadership and Congress. Despite severe reductions in defense budgets over the past decade, the appetite for capabilities remained, especially space capabilities. The tolerance for risk went up, and the team changed the way it did business, seeking to cut costs and levels of government involvement. It delegated too much responsibility to contractors, reduced the flexibility of program managers by giving them extremely small and heavily restricted management reserves, and fell short in budgets for research and development, a practice that can strangle leading edge technology programs, yield insufficient options, and increase risk in developing those actually available.

the Air Force is working to ensure a comprehensive approach to national security space

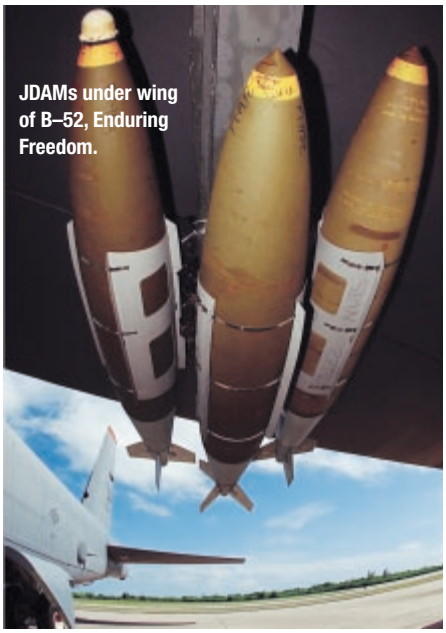
To fix these problems, the team has implemented some changes, but more are required. The commander of the Space and Missile Center has been dual-hatted with the duties of the Air Force program executive officer for space, reporting in the latter capacity directly to the Under Secretary of the Air Force. The team has also taken steps to streamline the overall process by reducing acquisition decisionmaking time, including independent cost assessments.

Accountability is another area of emphasis. The contract recently awarded on the tri-agency national polar-orbiting operational environmental satellite system included a new twist: an executive compensation clause. It states that the board of directors of a company must consider program performance when determining the amount of compensation to award its top executives. It is the intent that such a clause will be implemented on all major new national security space contracts.

These steps are only the first of many to vector space acquisition in the right direction. The national security space team is committed to making further changes across the spectrum of acquisition, with emphasis on adequate fiscal reserves and schedule flexibility, more focused management attention, discipline in requirements, and openness throughout the leadership chain. These efforts are essential if the team is to deliver the critical space capabilities needed for joint warfighting in the years ahead.

Assured Access

Another key challenge is ensuring access to space when it is needed. Like a warship in port or an aircraft in the hangar, a spacecraft on the launch pad



JDAMs under wing of B–52, Enduring Freedom.

U.S. Air Force (Greg M. Kobashigawa)

contributes little to joint warfighting and national security. To wield space power effectively, the Nation needs reliable and responsive means to get critical space systems into the fight; and that means getting them on orbit.

Legacy launch systems were expensive, with launch schedules measured in months or years. The team has worked to change that. The past year has seen successes with the maiden launches of two launch vehicles, the Atlas V and the Delta IV, both part of the evolved expendable launch vehicle program. These new launchers herald a new era of less expensive, simpler, and more reliable means to deploy space systems.

But the expendable launch vehicle is only the first step toward true assured access to space. We are exploring follow-on possibilities for responsive launch, from advanced and highly versatile reusable launch systems to small, low-cost expendables with extremely short response times. The goal is getting into orbit inexpensively, reliably, and on schedules measured in days or hours.

another effort that could benefit joint warfighters is space-based radar

Transforming Capabilities

In view of the threats of the 21st century, it is vital across DOD to strive to meet the President's mandate to renew and rebuild warfighting concepts, organizational constructs, and force structure. The efforts in the national security space arena are not meant to transform space systems in themselves but to produce those new capabilities that enable transformed warfighting as a whole.

One key initiative underway is development of a transforming communications architecture. The vision is eliminating bandwidth and access as constraints for warfighters. Such a frictionless global communications network will certainly rely heavily on terrestrial communications pathways. But truly global coverage, anytime, anywhere, for anyone, will rely on space for a considerable amount of this capability. It is the only way warfighters in remote locations—and the Navy at sea anywhere—will be able to plug into such a network.

This increasing need for communications is widely recognized. Last year the National Security Space Architect led a study to outline a vision for an integrated communications network that included both laser and radio frequency communications capabilities. The study confirmed that the baseline program plan would not meet forecast requirements and the architecture needed for transformation. It also suggested that there is now a critical window of opportunity to provide an architectural framework for a compatible communications system across the defense establishment, the intelligence community, and the National Aeronautics and Space Administration that increases capabilities by a factor of ten. The mission of the new Transformational Communications Office is developing the architecture and acquisition strategy to make this communications goal a reality.

Another effort that could benefit joint warfighters is space-based radar. It is envisioned that this radar will act as the forward eyes for strike platforms and other intelligence, surveillance, and reconnaissance (ISR) assets by detecting surface movers (ground moving target indication) and rapidly imaging stationary targets (synthetic aperture radar). With a day/night, all-weather ability to look deep into denied territory, multiple theaters, and broad ocean areas, we hope to observe and predict adversary activities before, during, and after conflict. The potential of space-based radar for more precise and timely terrain mapping—high resolution terrain (elevation)—may yield benefits for mission planning and rehearsal, particularly for Special Operations Forces or other assets that may be inserted behind enemy lines or borders.

Beyond transforming communications and radar, we are pursuing new sources and methods of information and intelligence collection and exploitation that will yield transforming capabilities for national security. Systems that perform hyperspectral imaging or exploit measurement and signature intelligence in ways as yet unexplored exemplify such initiatives. Truly transformational capabilities will exponentially increase existing asymmetric advantages in warfighting, ensuring that any clash would be as one-sided as possible.

Science and Technology

Transforming warfighting and intelligence calls for continued investment in space science and technology efforts. Everything accomplished in national security space to date stems from past investments and developments in this area. Apportioning resources can be difficult since it requires stable, long-term investment and typically does not provide immediate benefits to current programs. But we cannot shy away from the responsibility to invest today for future capabilities—we must push the technology envelope.

Investments alone will not guarantee that the defense and intelligence communities obtain preeminent future space capabilities. Science and technology planning must be improved to ensure that we encourage an operational pull that conveys a clear vision of the

MOAB, largest nonnuclear precision-guided weapon.

DOD

capabilities needed for the future, address the full spectrum of future needs in a balanced and well-thought-out manner, and determine ways to demonstrate and spin-out promising technologies to programs.

Another critical ingredient is collaboration. A number of organizations contribute to science and technology, including the Air Force Research Laboratory, Naval Research Laboratory, and the National Reconnaissance Office. The more these agencies work together, and the more they involve other actors such as the Defense Advanced Research Projects Agency and the National Aeronautics and Space Administration, the more productive science and technology efforts become.

Fostering Professionalism

At the end of the day, developing a new professional culture among space professionals may prove the most decisive step. All the space capabilities imaginable will prove useless without the leadership, vision, motivation, and skills to employ them effectively.

Air Force Space Command is spearheading efforts to develop the process of growing space professionals within the service. But these efforts must not be limited to the Air Force alone. The Armed Forces as well as the civilian and industry workforce will need space professionals to exploit space in the interest of national security.

The goal of developing a team of space professionals has bold implications. It is not simply creating a career field or developing an area of expertise. It involves steps that will eventually lead to an entirely new kind of warfighter that may ultimately transform the landscape of war. This process demands new ways of thinking. It will take time to nurture a space team—as it did with the development of land, sea, and air professionals before them.

Space capabilities are not ends in themselves. The objective is the ability to exploit the high ground of space to conduct decisive joint operations and enhance national security. That cannot be achieved without mission success in space. It means maintaining achievements in launches, keeping on-orbit capabilities at their peak, and ensuring that space support—missile warning, intelligence, weather data, and communications bandwidth—is readily available for whoever needs it.

Integration

Another essential ingredient to enabling effective joint warfighting is integration—among land, sea, air, and space; between old and new platforms; of new requirements and systems; and among organizations across and down all sectors of government. There has been great progress; the range of those exploiting space capabilities has expanded from a small set of strategic users to multiple government agencies and virtually the entire warfighting force. But more is needed.

The conduct of intelligence, surveillance, and reconnaissance is an example. Airborne and spaceborne assets each have unique performance characteristics that complement one another. Advances in unmanned aerial vehicle technology are impressive, and the characteristics of these vehicles make them extremely valuable in environments such as Afghanistan. But spaceborne ISR assets have their own natural advantages, especially swift global reach and access. The requirement today is global. There is not a divot or puddle we do not want to access—and space capabilities are what reach those areas denied to other platforms for intelligence collection. Successful integration simultaneously leverages all these advantages to benefit warfighters.

We will have achieved effective integration when the way we collect information is unimportant; where the

machines, regardless of type or location, are talking to one another; where intelligence and information are easily obtained, whether the user is an intelligence analyst in Washington or a soldier in the field; where fixing, tracking, and targeting data are passed easily from platform to platform.

Controlling the High Ground

Gaining and holding the high ground has been a prescription for military success since the dawn of time. Space is the ultimate high ground, and although space exploration has gone on for almost half a century, the need to protect vital space capabilities is only now becoming accepted as comparable to control of the land, sea, and air. The national security needs to dominate space will only increase.

The first ingredient for control is awareness of the space environment: natural phenomena, spacecraft traffic, and natural or manmade threats to space systems. Steps have been taken to increase situation awareness capabilities, including the standup of the Space Situation Awareness Integration Office in Air Force Space Command and funding for surveillance assets over the next five years.

the need to protect vital space capabilities is only now becoming accepted as comparable to control of the land, sea, and air

Control also requires protecting capabilities. The Nation must not take space capabilities for granted, nor can it ignore the increasing role they will play against friendly forces. If enemies recognize the value of space capabilities in modern warfare, they will not only seek to use them but to deny their use to others. These are the sorts of issues the Space Commission had in mind when it warned of a "Space Pearl Harbor."

Achieving effective space control also requires denying the high ground to enemies. With the integration of space capabilities across the spectrum of its warfighting operations, the United States is paving the road of 21st century warfare, and others will follow. What will occur in five years when Americans are put at risk because enemy spaceborne imagery collectors, commercial or home-grown, identify and target the Armed Forces? What will be the response in a decade when an enemy leverages the global positioning system to launch an attack with precision?

The mission of space control has not been at the forefront of military thinking because an enemy using space capabilities has not yet put our own people at risk. That will change. Planners not only need to think about the mission and implications of space control, but it is fundamentally irresponsible not to consider them. Space is the ultimate high ground. The military advantage requires maintaining an edge over opposing capabilities, and American doctrine and capabilities must keep pace in meeting that challenge.

Future Warfighting

As space capabilities mature, integration into warfighting on land, at sea, and in the air is essential, and controlling the high ground of space is vital. But are there new and more innovative ways to exploit that medium to achieve desired warfighting effects? Are there ways these capabilities can affect global strike operations in forms we can scarcely imagine today? Are there ways to use space capabilities to affect the enemy decisionmaking cycle or produce other effects to achieve campaign objectives in ways land, sea, and air forces cannot? Perhaps someday a lethal synergy of space positioning and tracking systems (global positioning and space-based radar) and high-ground weapons (the proposed space-based laser) will prove decisive in some circumstances. Or coupling space capabilities with information warfare will shut down an enemy command and control system before it can launch an attack.

We can no more perceive what contributions space will make to warfighting in future decades than military leaders a hundred years ago could foresee the impact airpower would have on warfare today. But we must be open to any and all possibilities that would save lives, benefit warfighters, and protect the Nation.

The extent to which space has been used for military and other needs is phenomenal, and its uses in the future seem limitless. The Nation has embraced the potential for space-based capabilities, and the Armed Forces do not wish to fight without them any more than the civil sector would be willing to give up satellite communications, direct broadcast, global positioning, or weather services. Accordingly, planners must ensure that space systems and architectures are available for joint warfighters.

Space is inherently global and uniquely capable of supporting global interests. The ability to know about events, shape relations among states, project power, and deter or compel enemies will increasingly depend on space. These factors present challenges to the United States in accomplishing its national security objectives. JFQ

Arming B–1 with 2,000-pound JDAM.

U.S. Air Force (Dave Nolan)

U–2 returning from mission, Enduring Freedom.

1st Combat Camera Squadron (Reynaldo Ramon)

FORGING Space Warriors

By LANCE W. LORD

In Enduring Freedom, U–2s are flying over Afghanistan, collecting data, and then sending it back to 9th Intelligence Support Squadron at Beale Air Force Base, where the imagery is analyzed and potential target coordinates are mensurated. The coordinates are passed along to the Combined Air Operations Center at Prince Sultan Air Base to prioritize and include in the air tasking order. Coordinates and imagery sent from the United States are used to match weapons with targets. This reliance on reachback is key to expeditionary culture and has reduced the number of deployed personnel. The capabilities provided by Air Force Space Command are an indispensable but nearly transparent part of what makes reachback possible.

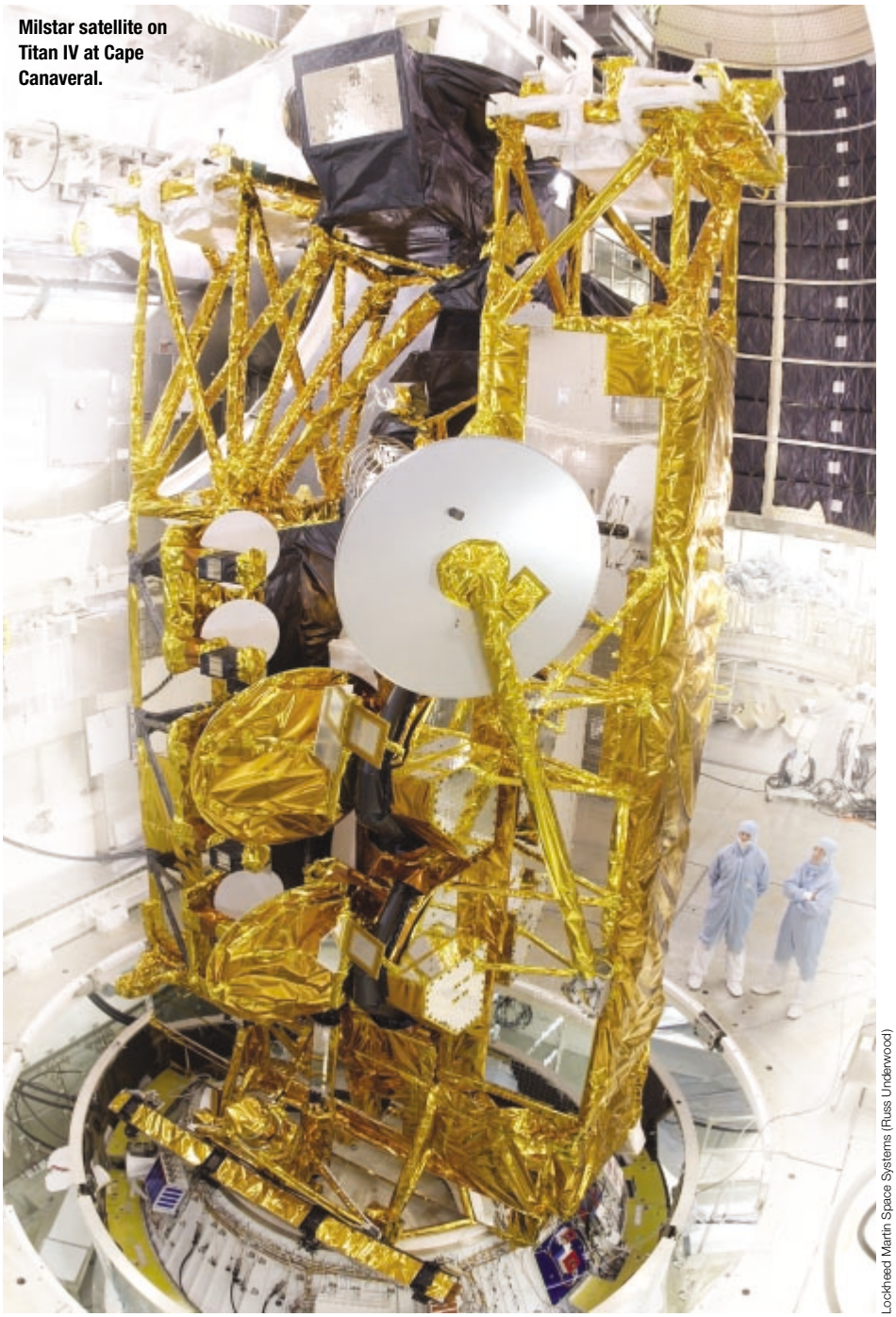
In one of the most decisive battles in Western history, Aetius defeated Attila the Hun at the Battle of Châlons in 451, in part because of a considerable advantage gained by seizing high ground on the enemy flank in an initial battle. After many centuries and myriad technological advances, that

General Lance W. Lord, USAF, is Commander, Air Force Space Command, and also has served as Assistant Vice Chief of Staff, U.S. Air Force, as well as Commander, Air University.

tactic is still valid. Joint Publication 3-14, *Joint Doctrine for Space Operations*, highlights the fact that space is the ultimate high ground, because it provides global access and extensive advantage. Within the Air Force, those capabilities and their battlefield effects are the responsibility of Air Force Space Command, which organizes, trains, and equips space and missile forces to exploit and control the high ground of space.

The joint force relies on space capabilities that were not envisioned at the start of the 1950s. Military capabilities originally developed for strategic purposes have evolved to be employed on the operational and tactical levels. Space provided both satellite communications and weather data to operational-level commanders in Vietnam. The Phu Lam Signal Battalion was one of the first units in the Army to deploy satellite capabilities, and the Air Force brought the defense meteorological satellite program out of the black world to support warfighters. In Desert Storm, a range of space capabilities was employed, from navigation and timing to missile warning.

Space assets are key enablers in the process of finding, fixing, tracking, targeting, engaging, and assessing an enemy—the so-called kill chain. Controlled through satellite relays, unmanned aerial vehicles attack targets on the ground. Satellite-guided weapons such as the joint direct attack munition are used with devastating effect while minimizing collateral damage. Capabilities in space have become critical to military effectiveness. In his testimony before Congress, the Commander of U.S. Central Command, General Tommy Franks, USA, remarked that much of the success of Enduring Freedom would not have been possible without those assets.



Milstar satellite on Titan IV at Cape Canaveral.

Lockheed Martin Space Systems (Russ Underwood)

Providing and Enabling

Air Force Space Command is both a force provider and a force enabler. It is an integrated organization of 40,000 military, DOD civilian, and contract personnel who ensure that the systems designed, built, and operated by the command provide capabilities for the Armed Forces to generate battlefield effects. The command has three main roles. First, it organizes, trains, and equips joint warfighters in the space and missile business. Second, it places great emphasis on its componency role, not only on expertise in intercontinental ballistic missiles and space. As part of the joint team, Air Force Space Command must be versed in land, sea, and air operations to provide capabilities to combatant commanders when and where needed. And third, the command is helping to make the new role of the Air Force as executive agent for space a resounding success.

These three roles are critical to defending the Nation through the control

Force Enhancement Mission Areas, Primary Orbits, and Current and Planned Systems

Mission Areas	Primary Orbits	Current and Planned Systems
Environmental Monitoring	Polar Low-Earth Orbit (LEO)	Defense Meteorological Support Program (DMSP), National Polar-Orbiting Operational Environmental Satellite System (NPOESS)
Communications	Geostationary Orbit (GSO)	Defense Satellite Communications System (DSCS) II, DSCS III, Global Broadcast System (GBS), Wideband Gapfiller System (WGS), Advanced Wideband System (AWS), Transformational Communications System, Milstar, Advanced Extremely-High Frequency (AEHF) System, Ultra-High Frequency Follow-on (UFO) System, Mobile User Objective System (MUOS)
Position, Velocity, Time, and Navigation	Semi-synchronous Orbit	Global Positioning System (GPS), GPS II/IIA, GPS IIR, GPS IIR–M, GPS IIF, GPS III
Integrated Tactical Warning and Attack Assessment	Polar Low-Earth Orbit and Geostationary Orbit	Defense Support Program (DSP), Space-Based Infrared System (SBIRS) High, Space Tracking and Surveillance System (STSS)
Intelligence, Surveillance, and Reconnaissance	Various	Legacy Systems, Future Imagery Architecture (FIA), Integrated Overhead Signals Intelligence Architecture (IOSA)

Source: Joint Publication 3-14, *Joint Doctrine for Space Operations,* and *Air Force Magazine,* Space Almanac edition.

and exploitation of space. In support of that broad mission, systems and capabilities are grouped into four areas.

space superiority—the freedom to conduct operations without significant interference from enemy forces—must be achieved in future conflicts

First, the counterspace mission area addresses the need to gain and maintain space superiority—control of space—as an initial step in space operations. As history has demonstrated, the ability to exploit a medium comes with control of it. Space force enhancement and application are mission areas that utilize exploitation capabilities. Finally, space support is a mission area that provides the foundation of space operations. These four areas match the core competencies that were recently refined by both the Secretary of the Air Force and the Chief of Staff of the Air Force.

Counterspace

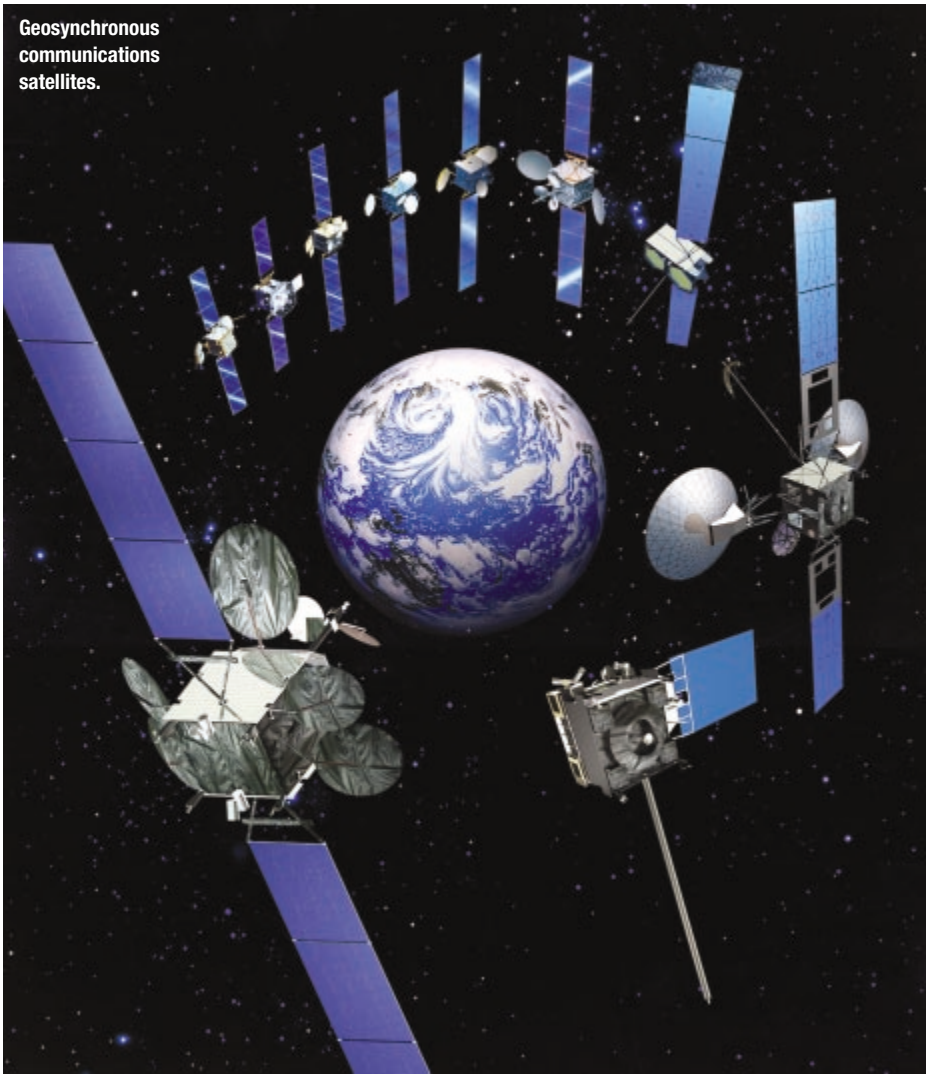
The military has historically evolved to exploit new means of warfighting. The Montgolfier brothers tested the first hot-air balloon in 1783. Benjamin Franklin observed some of the trials in Paris and wrote home of the military utility of balloons, predicting that they would be employed for spying, dropping bombs, and ferrying invading armies across enemy-dominated seas. Eleven years after those first tests, the French used a tethered balloon to observe the battlefield and direct fire against the Austrian forces at the Battle of Fleurus. The Austrians took exception to what they regarded as a violation of the Napoleonic code of war, and on the second ascent fired artillery at the balloon.

Just as the Austrians challenged the French after identifying a new center of gravity, those who are dependent on space should expect to be tested. The United States holds an asymmetric advantage in space, and if history is any indication, potential enemies are watching and learning. Space superiority—the freedom to conduct operations without significant interference from enemy forces—must be achieved in future conflicts. The counterspace mission area relies on space situation awareness, defensive counterspace, and offensive counterspace.

Air Force Space Command uses a space surveillance network that combines ground-based radars and optical sensors to perform the space surveillance portion of space situation awareness. It enables 1st Space Control Squadron at Cheyenne Mountain to detect, identify, characterize, track, and catalog high interest space objects. The Space Situation Awareness Integration Office was also recently established in Colorado Springs to work on a number of initiatives. For example, an effort is underway to identify system requirements for sensors and communication links among satellites to determine whether a spacecraft is the target of intentional interference. The office will move the command beyond simple space surveillance, fusing information with intelligence, reconnaissance, and environmental data to provide an integrated operational picture.

In terms of defense, the Air Force has added protective (survivability) countermeasures on a case-by-case basis to satellite systems to protect against jamming, signal interception, and nuclear detonation. Active defensive counterspace measures include satellite maneuvering and advanced antennas. Improvements are being made in detecting, characterizing, locating, and assessing attacks or intrusions into friendly operations. Work is also being done to negate counterspace systems and prevent enemies from exploiting U.S. capabilities. Last, spacecraft survivability is being enhanced by improved tactics, techniques, and procedures.

The conventional offensive counterspace capability to negate enemy use



Geosynchronous communications satellites.

Boeing Satellite Systems

of space consists of physical attacks against a terrestrial node. The near- and mid-term strategy for improvement in these capabilities includes fielding initial ground-based assets like mobile countercommunications systems and counter-ISR systems to deny and disrupt enemy use of satellite communications and optical sensors respectively.

A growth area, the counterspace mission is being transformed by revolutionary space-based capabilities in the mid and long term. One example is a space-based surveillance system that can provide details of space objects unattainable by ground-based systems. This development will expand on lessons learned from the midcourse space experiment, an advanced concept technology demonstrator sponsored by Air Force Space Command. Another is an attack detection and reporting architecture that can detect, characterize (identify and geo-locate), and report attacks on space systems as well as assess the mission impact. Other concepts include active protection capabilities and full-spectrum space-based systems to prevent unauthorized use of friendly space services and negate those of an enemy.

Space Force Enhancement

Many space systems critical to warfighting fall within the force enhancement mission area. In this enabling role, they provide missile warning, navigation and timing, vital communications, and environmental monitoring to the joint warfighter. These capabilities, and perhaps more importantly integrating them with other assets, were demonstrated in Enduring Freedom. Coalition forces used unmanned aerial vehicles, precision guided munitions, laser spotting equipment, and secure satellite radios, combined with veteran B–52s and horseback riders. This unprecedented integration had devastating effects.

Currently, space provides the capabilities to gather and disseminate timely, highly accurate information to enable situation awareness and effective command and control (C^2) on all levels.

- Air Force Space Command missile warning capabilities consist of defense support program satellites and ground-based radars to warn of missile attacks on the United States and Canada as well as theater missile attacks.
- The global positioning system (GPS) provides precision-positioning, navigation, and timing information, from basic navigation and synchronization of communications to basing, targeting, and terminal guidance of precision weapons.
- Air Force Space Command operates the Milstar constellation and provides day-to-day command and control of the defense satellite communications system (DSCS) to provide the voice, data, and video links essential to military operations.
- With the National Oceanic and Atmospheric Administration, Air Force weather satellites (including defense meteorological satellite program satellites and terrestrial and space environment sensors) provide battlespace environment forecasts vital to military planners and operators.

Systems are being replaced and upgraded to provide even better warfighting support while making the systems more efficient, easier to maintain, and more survivable.

- In the near term, Air Force Space Command will sustain the defense support program and field the space-based infrared system to modernize and ensure an uninterrupted and improved missile launch warning capability. The first segment of this new capability, the ground-processing segment, just declared initial operational capability. The enhanced launch detection and impact point prediction the system provides will greatly improve response options for theater missile threats.

Checking elevation with GPS in Persian Gulf.

100th Communications Squadron (Deborah K. Alvarado)

■ GPS satellites will be replaced with follow-on systems that feature additional military and civil signals with improved performance.

■ Requirements for satellite communications already exceed the capability. The transition from DSCS and Milstar to an integrated system-of-systems approach for follow-on wideband and extremely high-frequency networks will significantly increase capacity and data rates. Together with the Transformational Communications Office, efforts are underway to define an integrated defense and intelligence transformational satellite communications and relay system (part of the larger architecture) to support the intelligence, surveillance, and reconnaissance information needed for information dominance and operational awareness and to provide flexibility to support network-centric operations.

■ The evolution of the integrated command and control system for combatant commands will combine the missions of North American Aerospace Defense Command and U.S. Strategic Command into a single system rather than replace a mission-unique, stovepiped collection of systems.

In addition, transformational efforts have been initiated to provide improved support to Air Force Space Command. An initial space-based ground moving target indication capability is being planned for the midterm that integrates with air-breathing assets such as the joint surveillance and target attack radar system, unmanned aerial vehicles, and the multimission command and control aircraft. This will enable global strike forces to identify and track moving targets anywhere.

Space Force Application

In addition to being a force enabler, Air Force Space Command serves as a force provider, operating space force application capabilities that focus on nuclear deterrence and warfighting with both Minuteman III and Peacekeeper ICBMs and the infrastructure to maintain and protect them. Intercontinental ballistic missiles were designed to deter attack and remain critical to global stability. The Air Force was charged under the Nuclear Posture Review to "extend the life of Minuteman III until 2020, while beginning the requirements process for the next-generation ICBM." Existing nuclear strike forces are undergoing modernization, which will be critical to the offensive strike leg of the triad—offensive strike systems (nuclear and nonnuclear), defenses (active and passive), and responsive infrastructure.

in addition to being a force enabler, Air Force Space Command serves as a force provider

The command is also developing an advanced, flexible, and responsive global deterrent force as it explores ways to transform strike capabilities through the use of new types of launch systems and nonnuclear munitions. Options for conventional, prompt global strike would provide a range of selective lethality and could be fielded in the midterm. This capability from and through space will transform space force application. Most notably, a conventional strike capability will provide the President and Secretary of Defense with space power options for deterrence and flexible response when time is critical or other options are too risky. One option being considered is the common aero vehicle, a conceptual maneuvering reentry system launched by a ballistic missile or space launch system, delivering a payload from a suborbital or orbital trajectory.

Space Support

Access to space or spacelift as well as on-orbit satellite operations is provided through space support. For example, a DSCS satellite was recently launched on a Delta IV from Cape Canaveral that will provide wideband communications for U.S. Central, European, and Pacific Command areas of responsibility over the Indian Ocean. Operationally, 1st Satellite Control Battalion has responsibility for the Army communications payload and uses the Air Force satellite control network to relay commands to the satellite via a remote ground station like that operated by 50th Space Wing on Diego Garcia. This combination of spacelift and satellite control illustrates the mission of space support.

Getting into space today requires launch systems—with medium- and heavy-lift expendable boosters—and the ranges used for launch and testing. The Eastern Range is controlled from Cape Canaveral and the Western Range from Vandenberg Air Force Base. In the near term, the transition is being made to evolved expendable launch vehicles, the Atlas V and Delta IV, which represent a significant step toward a more responsive spacelift capability for both routine and time-sensitive military operations.

In addition to spacelift, space support includes satellite operations. The command operates a network of worldwide ground stations that monitor and control satellites and their payloads. This allows on-demand operations of government space assets supporting the full spectrum of military operations. Modernization includes implementing a strong operational training capability and work on an integrated client/server network with global connectivity shared by all the space organizations in both the civil and military sectors.

Moreover, Air Force Space Command is currently transforming space support capabilities by exploring

Building GPS SV11.

Lockheed Martin Space Systems (Russ Underwood)

launch systems, rapid satellite checkout, and other technologies to provide quick-turn, on-demand, assured space access for time-sensitive operations. The goal is an order of magnitude reduction in costs. There are also efforts to examine the development of orbital transfer vehicles to reposition or boost on-orbit assets and improve space-based elements of the launch and test range to increase coverage while reducing costs associated with the ground-based infrastructure.

Combat Capabilities

Success in any mission area is impossible without capable people. As dependence on space grows, the Air Force must meet the challenge of acquiring, operating, and employing space assets. A proactive space professional development program safeguards national leaders in space and develops airmen as the heart of that combat capability—an Air Force core competency. The recommendations of the Space Commission and the direction by the Secretary of Defense provide an opportunity to more deliberately focus on space professional development.

To implement this vision, a structured approach to developing space professionals has been established. It provides a comprehensive blueprint to address training, education, and experiential needs while recognizing the roles of military and civilian personnel. Additionally, it considers the disciplines represented by the space professional cadre, which accomplishes complex functions to take intercontinental ballistic missiles and space systems from concept to employment.

The harder task of implementing initiatives on the education, training, and experiential needs of the force will begin soon. Given the importance and complexity of professional development, this will constitute a long-term commitment. The Nation has the best space and missile operators and acquirers in the world and the Air Force will continue to improve on that standard.

Space superiority is essential to the vision of controlling and exploiting space to provide the Armed Forces with an asymmetric advantage. Although Enduring Freedom has provided the first opportunity for a fully integrated space presence on all levels of warfare, the mission of Air Force Space Command goes beyond any single operation. Improved missile and space systems, as well as concepts for their employment, will have greater results. As the security environment changes, more must be done to maintain the military advantages of the Nation. At the same time, achieving asymmetric advantage through a capabilities-based air and space force must be enabled. To meet that challenge, Air Force Space Command will ensure unparalleled space capabilities for joint forces when and where they are needed. **JFQ**

Horizontal takeoff and landing vehicle model.

U.S. Air Force

Architecting Space Programs

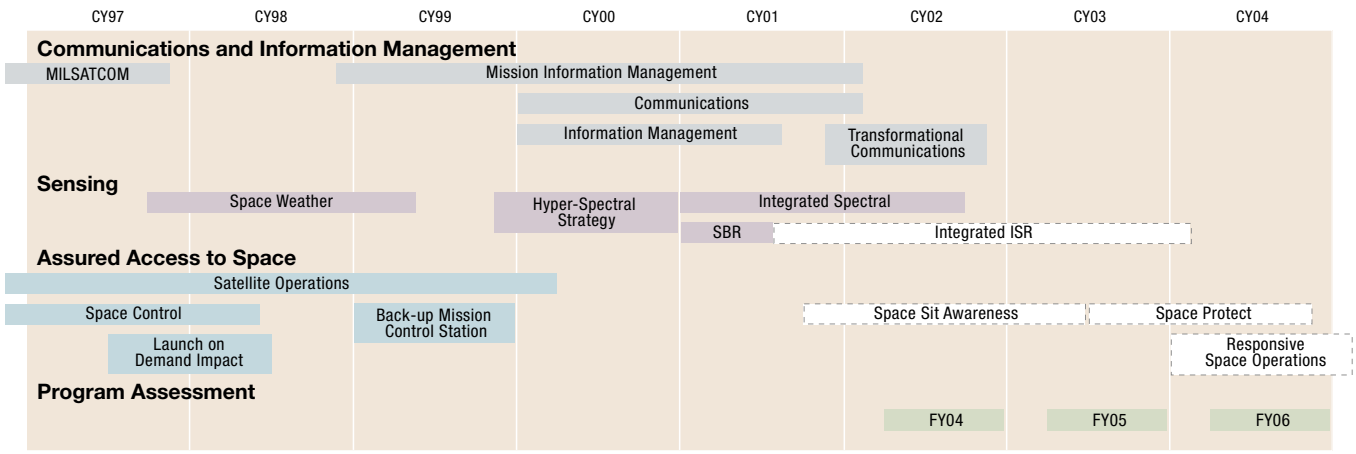
By STEPHEN J. FERRELL *and* HAL E. HAGEMEIER

In complex military and intelligence operations, senior leaders must make difficult choices on employing existing capabilities, improving them, and developing new capabilities. Decisions are becoming more intricate because of costs, technology, operational utility, threat uncertainty, system complexity, and system-of-systems relationships. As difficulties increase, policymakers continue to seek approaches that better support their decisions.

One popular technique is *architecting*—considering end-to-end capabilities in the context of related capabilities to meet expected needs. It is essentially focused on the big picture to provide insight on the utility and relationships of the components. The Joint Requirements Oversight Council realizes the importance of identifying the way that capabilities fit into an operating concept as implemented under

Brigadier General Stephen J. Ferrell, USA, serves as director of the office of the National Security Space Architect and Colonel Hal E. Hagemeier, USAF (Ret.), is assistant director of that office for strategy and initiatives.

Major National Security Space Architect Efforts



a joint integrated architecture. Moreover, the defense acquisition process is being revised to include architectures as means of characterizing relationships among various capabilities in order to guide systems development and associated investments.

the Secretary of Defense and the Director of Central Intelligence established the National Security Space Architect

Architectures are the structure, relationships, and principles that govern the design and evolution of elements that are linked in accomplishing a specific purpose. They inform choices well before they have to be made. They help explain the possible and the practical. It is important to note, though, that architectures exist on multiple levels: from specific, existing systems such as global positioning and its many components to far-term architectures for an entire enterprise such as communications.

Although space architectures exist on multiple levels, this analysis focuses on the mid and far term. Such architectures are potentially the most important in developing mission capabilities by providing a broad context for decisionmakers. Yet they are probably the least understood because they extend well beyond the future years defense program. They are vectors to vision statements, capabilities-based strategies, and enterprise-wide plans. Architecting, in this sense, is the process of defining national security space far-term objectives, planning near- and mid-term steps to accomplish them, and implementing informed decisions. Producing space architectures requires a dedicated effort to consider end-to-end capabilities across multiple organizations to achieve integrated results.

The Space Architect

The Secretary of Defense and the Director of Central Intelligence established the National Security Space Architect to develop and integrate security space architectures for the mid and long term across the full range of defense and national space missions. This organization is uniquely positioned to develop architecture over the next 15 to 25 years for the entire national security space enterprise. Recently, it has been tasked to assess trade-offs between space and nonspace solutions as well as the appropriate integration of space with land, sea, and air solutions, and to report on the consistency of implementation of national security space programs with policy, planning guidance, and architectural decisions.

These architectures are long-range goals and objectives expressed in terms of a framework for system development. They represent what the community believes will provide capabilities in the far term. Starting with existing architectures and examining future ones that will be available in the near and mid term based on planned investments, they also analyze alternatives to determine the best long-term course, given technologies, operational concepts, needs, threats, and resources. The resulting recommendations are supported by an investment strategy and roadmap.

Architecture recommendations often advocate actions necessary to ensure that the national security space community develops desired capabilities. They are neither point designs nor specific system designs—stakeholder organizations are capable of designing and building specific systems with the best available technology. Architectures define capabilities, principles, and relationships for achieving the overall desired capability in the future.

The National Security Space Architect develops these architectures collaboratively with the representatives of other interested agencies, spanning the military, intelligence, civil, and commercial sectors. It does not develop, build, buy, or operate space systems; consequently, the organization can be objective in considering various competing concepts and capabilities. The

Space tracking and surveillance system.

Northrop Grumman

agency ensures that all relevant ideas, opinions, and concerns are thoroughly analyzed and considers both space and nonspace perspectives. It is as inclusive as possible in all architectures, studies, and activities it leads and relies heavily on stakeholders and other participants to bring their considerable expertise and knowledge to the table. Although it strives for consensus, the goal is to determine the best way ahead for future national space capabilities.

Past recommendations have been approved by the National Security Space Senior Steering Group, which is composed of agencies with a stake in the architecture or study. It is cochaired by the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence, the Deputy Director of Central Intelligence for Community Management, and the Director for Force Structure, Resources, and Assessments, Joint Staff (J-8). The group has also directed transitional planning to guide implementation of architecture and study results when appropriate. Stakeholders then develop transition plans to implement approved architecture and study recommendations.

As a result of the Space Commission, the National Security Space Architect will function as a multiagency organization that reports to the Under Secretary of the Air Force. It expects continued review from the national security space community to represent stakeholder organizations, provide advice, vet equities, and recommend options for reconciling major differences among stakeholders.

Architecture Results

Since 1995, the National Security Space Architect (and its predecessor organization, the DOD Space Architect) has completed architectures and studies and conducted the first national security space program assessment for fiscal year 2004. It is currently developing two architectures and preparing to assess the program for the next fiscal year. The architecture and study products fall into four areas: communications and information management, sensing, assured access to space, and program assessments. Communications and information management efforts include military satellite communications, communications, and information management architectures, and the transformational communications study. Sensing includes space weather and integrated spectral architectures, the hyperspectral strategy and space-based radar studies, and one architecture under development—integrated intelligence, surveillance, and reconnaissance. Assured access to space includes space control and satellite operations architectures, the launch on demand impact and back-up mission control station studies, and the other architecture currently under development, space situational awareness.

Communications/information management. The goal of mission information management was developing the architecture and strategy to guide technology investment, acquisition planning, and program execution for national security information management capabilities in the 2010–2025

era. Completed in 2001, it encompassed all aspects of providing mission-essential information to executing organizations and included DOD services and agencies, the intelligence community, civilian agencies (comprising the civil applications committee), and other offices concerned with national security. Mission information management was split into two related areas: an information management architecture and a communications architecture.

The information management architecture contained recommendations to better integrate information needs across communities, provide cross-domain satisfaction management, encourage smart delivery of information, and develop common information standards. It developed a concept for providing the structure to integrate information technology capabilities, thereby combining information needs across the national security community into a common needs picture—a concept known as national security information management (NSIM).

This concept helps make efficient and effective use of information to automatically deliver it when generated while protecting sources and methods. It is designed to analyze user information needs to determine commonalities and maintain the association of those needs to individual users. The national security information management function has been organized under chief information officers drawn from the defense and intelligence communities to guide management architectures by identifying resident developing capabilities (such as the multi-intelligence acquisition program and the DOD horizontal fusion effort) and providing feedback to achieve the information management architecture vision. This office has paid dividends by providing assistance in changing the operations concepts for managing information for users such as the Coast Guard (high seas drift net concept of operations), the Department of State (noncombatant evacuation operations), and 14th Air Force (information flow for Joint Air Operations Center generation of products such as the air tasking order).


Launching defense support program satellite.

U.S. Air Force

the communications achitecture team recommended an integrated network over space, air, and terrestrial environments

As information management architecture took the means of managing the information in the pipes into consideration, communications architecture examined the pipes themselves far more comprehensively than the architecture for satellite communications had done. The communications architecture team, consisting of 30 stakeholders from across the defense establishment, intelligence community, and National Aeronautics and Space Administration, developed an architecture for the 2010–2025 era that recommended an integrated network over space, air, and terrestrial environments with dynamic routing, prioritization, and bandwidth allocation; an airborne communications network; an integrated government space relay system; interoperable space cross-links; and the necessary interfaces to terrestrial optical networks. These capabilities will provide both more bandwidth and more accesses to the user.

The vision created by the communications architecture in turn became the inspiration for a study that outlined a relatively near-term plan for a truly transformational capability, increasing the bandwidth available to support the anticipated explosion of

user requirements by using long-desired technologies, some with great technical risk. It incorporated interoperable laser communications and other technologies to meet the growing needs in the defense and intelligence communities. The study examined broadcast, relay, and point-to-point military satellite communications, including low probability of intercept/low probability of detection/anti-jam protected communications to ensure that future capabilities are as good as or better than the advanced extremely high frequency capabilities planned for 2010. It also affirmed the feasibility of these efforts and outlined a roadmap to attain them. The recently organized transformational communications office is preparing the groundwork in architecture for the acquisition community to develop a network-centric capability to eliminate bandwidth constraints and connect more users to satellite communications. This is a clear example of long-term space architecting affecting near-term acquisition.

Sensing. If communications provide the how, then sensing technologies provide much of the what. The integrated spectral architecture and space-based radar studies established important groundwork for the ongoing integrated intelligence, surveillance, and reconnaissance architecture.

The integrated spectral architecture generated an integrated end-to-end spectral remote sensing architecture for the 2020 timeframe across DOD and the intelligence and civil communities. For the first time it identified fundamental capabilities where an integrated spectral remote sensing architecture might have utility:

- periodic Earth coverage for detecting both materials and changes
- periodic area search of theater-sized regions to detect and classify facilities, vehicles, and equipment
- focused in-depth target characterization
- near-continuous worldwide persistent surveillance
- a user-directed, network-centric environment where the user has direct control over most of the information product generation.

Earth from outer space.

DOD

The Road Ahead

The integrated spectral architecture considered that all five capabilities should be included to realize the full benefit of technology. It has also laid out a roadmap for achieving them before 2020. Some aspects of the plan are underway while others remain unfunded. From a military perspective, one of the most important capabilities is area search. A proposed program that demonstrates this capability is the enhanced hyperspectral experiment (Noble Eye), which would allow warfighters to detect vehicle-size targets over a broad area and cue other sensors to characterize the objects. This would confirm or deny the existence of targets in an area of operations and help optimize lethal targeting capabilities. The other critical consideration, which must be developed as sensor capabilities are fielded, is creation of an information environment where users have direct control of much of their own product generation.

Another potential capability of interest to military and intelligence planners is space-based radar. Its benefits are significant, but candidate systems have either been considered too expensive or the necessary technologies are seen as immature. That picture seems to be changing. A study by the National Security Space Architect in 2001 outlined a capabilities roadmap for the military, intelligence, and civil communities. It assessed the state of technologies required to realize radar for ground moving targets and related missions and identified the critical technologies for a capable, affordable space-based radar. The study also addressed an approach to satisfy as many common needs from across the communities as possible to prevent multiple competing acquisitions.

Spectral remote sensing and space-based radar represent aspects of a broader mission area: intelligence, surveillance, and reconnaissance. The integrated architecture for this mission area that is currently being developed has a cross-community investment strategy, with air and space study tasks being incorporated into the transformational space and airborne project. This study supports military, intelligence, and civil needs integrated across space and nonspace solutions for the

2015 timeframe and beyond. A major thrust is exploring new operational concepts and technologies and addressing the objective of persistence and achieving it in a mix of air and space capabilities. The architecture is expected to be complete this year.

Assured access to space. To collect and provide data through space, one must first have assured access. The National Security Space Architect is completing a space situational awareness architecture and will begin architectures for space protection and responsive space operations.

situational awareness is the basis of space control, the ability to ensure that the Nation can take advantage of space capabilities

Space situational awareness is addressing every aspect of the space environment, including tracking and cataloging space objects, charactering the objects (size, shape, payloads, capabilities, and activity), gathering information on the space environment, and managing related data. This effort will develop an end-to-end architecture for 2020 that provides space situational awareness to a wide range of customers. Situational awareness is the basis of space control, the ability to ensure that the Nation and its allies can take advantage of space capabilities and deny them to potential enemies. This architecture is scheduled to be completed in summer 2003.

Protection architecture will follow the space situational awareness effort. As dependence on space capabilities has increased, the requirement for protection has grown. However, existing approaches for mission assurance, risk assessment, and protection are usually focused on individual systems or segments, constrained by limited budgets, or overridden by a desire for utmost system performance. This effort will develop an architecture that optimizes space system mission assurance for national, warfighting, and civil users across the range of space assets and establish a priority for protecting those assets.

The responsive space operations architecture, expected to begin in late 2003, will examine the proper blend of space assets and capabilities encompassing launch, infrastructure, and payload designs to provide space capabilities for rapid response to world events, technological advances, evolving military doctrine, and other factors which drive changes in national security needs. This architecture will provide an integrated end-to-end solution as a foundation for more responsive, inherently flexible space operations and acquisition concepts providing transformational capabilities and assured support to defense, information community, and civil users.

Program assessment. Evaluating progress in planned architecture capabilities is essential. In 2002 the National Security Space Architect assessed the national security space program in the FY04–FY09 program objective memoranda. This assessment emphasized end-to-end architecture to determine if the programmed capabilities would satisfy major civil, defense, and intelligence policies and guidance. Based on the recommendations of the Space Commission, the defense and intelligence communities identified the elements that made up their respective space and space-related programs, referring to them as the virtual major force program for space. The assessment used these programs, together with other relevant programs, including key civil capabilities, for the FY04 assessment.

The program assessment highlighted areas of interest to senior policymakers, including the Under Secretary of the Air Force and Director of the National Reconnaissance Office, Director of Program Analysis and Evaluation within the Office of the Secretary of Defense, and Deputy Director of Central Intelligence for Community Management, to better synchronize funding across the space community. With the benefits of the space program assessment architectural perspectives on capabilities and other program reviews, leaders received information on which to base decisions on final adjustments to service and agency program costs prior to the budget submittal to Congress. The goal is ensuring unity of effort in acquiring and operating preeminent space capabilities.

Systems tend to be developed in an evolutionary and often stovepiped fashion, with each version an improvement on the last. The exceptions are usually represented by new technology or operational concepts—or a combination of both. But as the cost of systems has escalated without comparable increases in spending, the Nation cannot settle for the next generation to be simply better in incremental terms or exploit each new technology or operational concept, however revolutionary. Various systems must work in concert and provide capabilities to achieve the desired effects.

Leveraging the synergy among capabilities offers the best opportunity to achieve the highest possible utility and perhaps compensate for inadequate resources. Mid- and far-term architectures are key to developing integrated capabilities based on technical feasibility, the operational concepts within which the capabilities will be employed, and expected policy and resource constraints. They also focus science and technology on ensuring that future capabilities are available to joint warfighters.

Senior policymakers realize that long-term architectures provide a better understanding of relationships affecting complex decisions. Perhaps this is particularly true for space capabilities given their absolute dependence on technology, interdependencies among systems, long lead times, and numerous relations with terrestrial capabilities. The National Security Space Architect provides a unique perspective and cross-community approach to enable informed decisions. **JFQ**

Artist's rendering of Brilliant Pebbles.

Courtesy Missile Defense Agency

Space and Missile Defense

By DONALD R. BAUCOM

Since the dawn of the space age, developing space-based systems has never been a purely technological matter. The first orbital satellites raised questions on the legality of overflights and activities in space. The world community turned by habit to treaty negotiations and international law to resolve the implications of such issues.

Overflights were assumed away as the United States and the Soviet Union launched scientific satellites to mark the International Geophysical Year in 1957. De facto rights on overflight were established in October of that year when Sputnik went into orbit. Soon Washington and Moscow opened talks on restricting space-based military operations, with the United Nations providing the venue for creating a legal framework on the international governance of space.

With American prodding, the United Nations organized a Committee on the Peaceful Uses of Outer Space in late 1958, which became a major forum for developing international principles. The work of this committee, together with diplomatic efforts by the major nuclear powers, produced a number of agreements on military activities in space.

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In August 1963, the United States, Soviet Union, and United Kingdom signed the Limited Test Ban Treaty in Moscow. This agreement, which eventually had over a hundred signatories, prohibited nuclear testing in space. Two months later, the United Nations adopted a resolution that banned nuclear weapons in space and in December 1963 passed a resolution establishing a set of general rules on the use of space. While this document included a requirement for "international consultations" before a nation took actions that might interfere with the peaceful use of space, it did not ban military systems. The terms of the resolution effectively allowed the United States and the Soviet Union to deploy military satellites. This result was not surprising: deployments had already become central to the space programs of the two superpowers.

The next major U.N. space-related agreement, the Outer Space Treaty of 1967, received unanimous approval from the General Assembly. Signed by 66 nations, it mustered a vote of 88–0 in the Senate. Its provisions did little more than consolidate the terms of the earlier resolutions and recast them in the form of a binding treaty. The superpowers remained free to deploy military satellites as long as they did not interfere with peaceful activities in space.

Signing Limited Test Ban Treaty.

AP/Wide World Photo

Space-Based Missiles

When the Senate ratified the Outer Space Treaty, the Pentagon had been pursuing missile defenses for two decades, starting with the discovery of German wartime plans for an intercontinental ballistic missile (ICBM) that could have reached New York by 1946. At the outset of the program, limitations in sensors, missile controls, and guidance systems required interceptors to be nuclear-tipped in order to destroy relatively small, high-speed targets presented by long-range missiles. The first American missile defense interceptor, the Nike-Zeus, was a large, ground-controlled projectile that carried a multimegaton warhead.

While the Nike-Zeus was in the initial stages of development, the Advanced Research Projects Agency (ARPA) was established as a response to the launch of Sputnik. Among its first efforts was Project Defender, the search for a defense against ballistic missiles. Previously, space-based missile defenses were considered impractical because of the on-orbit mass associated with a constellation of nuclear-tipped interceptors. However, when researchers gathered in 1960, that perception had begun to change. Their work indicated that it might become possible to develop an interceptor that could destroy targets by physically colliding with them. The energy released by such an impact would be six times that of exploding TNT equal to the mass of the interceptor. As one study indicated, this hit-to-kill (HTK) concept "removes the necessity of using a nuclear warhead and replaces it with a simple, cheap, lightweight mechanical device." That meant weight in orbit could be reduced by about two orders

the Advanced Research Projects Agency was established as a response to the launch of Sputnik

Marking SDI anniversary.

AP/Wide World Photo (Charles Tasnadi)

in magnitude. Boost-phase intercept was no longer mere fancy; it was a concept regarded as "sufficiently promising to warrant increased study."

Several of the concepts for space-based interceptors (SBIs) advanced in 1960 were capable of boost-phase kill and were collectively known as ballistic missile boost intercept (BAMBI). One of them was the space patrol active defense (SPAD). It included a 30-ton satellite with an infrared scanner to pick up boosters, a computer to calculate their tracks, and 140 interceptors weighing 300 pounds each. Fired from the host satellite, each interceptor would deploy a wire web with a radius of 15 to 50 feet containing many 1-gram pellets fixed along the radial wires. Although the pellets could damage ICBM nose cones, causing them to burn up on reentry, they were designed to attack vulnerable fuel tanks in the booster. Striking at velocities up to sixty thousand feet per second, they would inflict catastrophic damage. To ensure system effectiveness, 500 satellites would be orbited at an altitude of 250 miles above the earth.

Among the challenges of developing such a system was using infrared sensing devices to detect missile launches and guide interceptors to their targets. If the former seemed manageable, the latter did not. "Several magnitudes of improvement" were required for the second function. Other obstacles included achieving stability in satellites, dealing with countermeasures, reducing launch costs, and improving the reliability of space-based systems.

Technology in the early 1960s was incapable of reifying space-based concepts that emerged from Project Defender. Nevertheless, the project spawned a stream of research and development efforts that eventually fed into the Strategic Defense Initiative (SDI), launched in 1983.

Hit-to-Kill

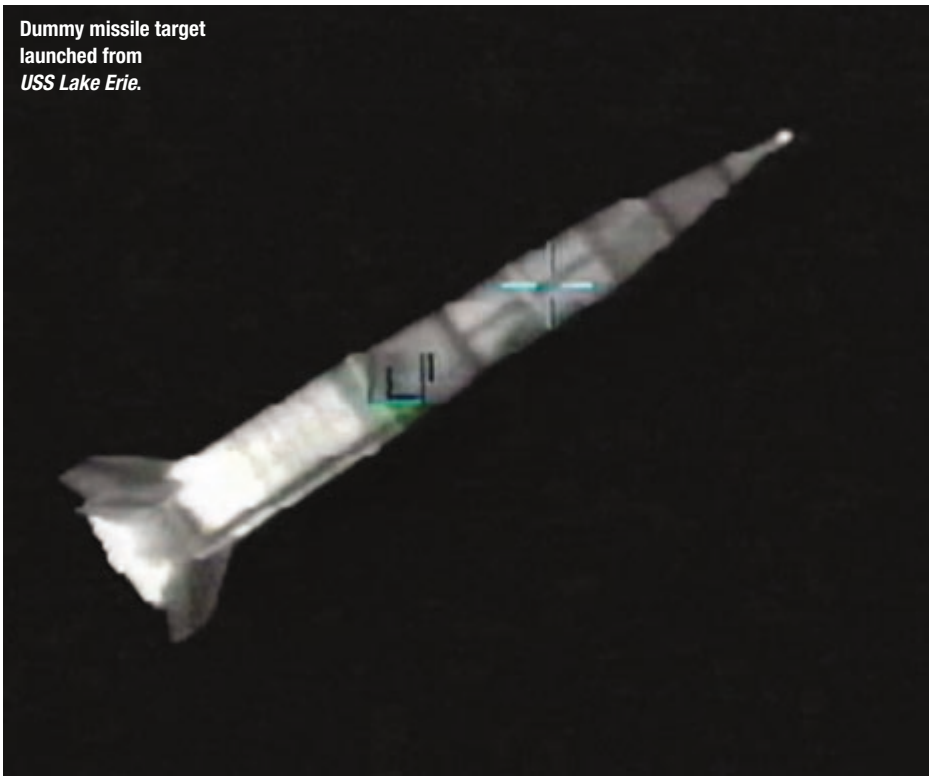
While Project Defender was examining missile defense concepts, the Vought Corporation began focusing on the homing interceptor-terminal (HIT). Sponsored by ARPA and the Army, this program aimed at producing "a small and lightweight, spin stabilized, optically guided interceptor that achieves hypervelocity direct impact kill of reentry vehicles in the exoatmosphere." The effort continued into the 1970s when HIT technology was applied to the miniature system project (MSP), the development of an anti-satellite (ASAT) capability for the Air Force. MSP led to the miniature homing vehicle (MHV), which was virtually identical to earlier HIT vehicles. MHV would serve as the kill vehicle in the ASAT system to be launched from the F–15 fighter. The program culminated in 1985 when MHV destroyed an orbiting satellite.

As HIT technology was transitioned into the Air Force ASAT program, the Army Safeguard missile defense system began a short operational life span. Safeguard was a layered system with two types of nuclear-tipped interceptors. The long-range Spartan, an outgrowth of the Nike-Zeus program, was designed to attack incoming warheads at the edge of the atmosphere. Warheads that got past Spartan would be destroyed inside the atmosphere by the high-speed, short-range Sprint.

Safeguard, which became operational in 1975, had a major disadvantage; the detonation of the nuclear warheads on Spartan and Sprint would blind its radars. It was further limited

by the ABM Treaty and the 1974 protocol to that agreement, restricting signatories to a single missile defense site with a hundred interceptors. Moreover, it prohibited deployment, if not development, of space-based missile defense systems. Since Safeguard could only defend ICBM silos near Grand Forks in North Dakota, and could itself be overwhelmed by a Soviet attack, Congress acted to terminate the system in 1976.

With the end of Safeguard, the Army focused missile defense on exoatmospheric hit-to-kill interceptors. Work on this program culminated in 1984, when a homing overlay experiment (HOE) test vehicle collided with an unarmed reentry vehicle over the Pacific Ocean, verifying the principles behind exoatmospheric HTK interceptors. HOE success pointed toward a revolution in interceptor design; nuclear warheads were no longer required to achieve a reasonably high kill-probability. The accomplishments of this program, along with earlier work on HIT, provided a strong technology base for the space-based interceptor programs pursued under SDI.



Dummy missile target launched from *USS Lake Erie.*

AP/Wide World Photo

The Role of Interceptors

President Ronald Reagan announced the decision to begin the SDI program in 1983. After a year of study and two and a half years of research and development, the Secretary of Defense approved the acquisition of the phase I architecture for the strategic defense system (SDS).

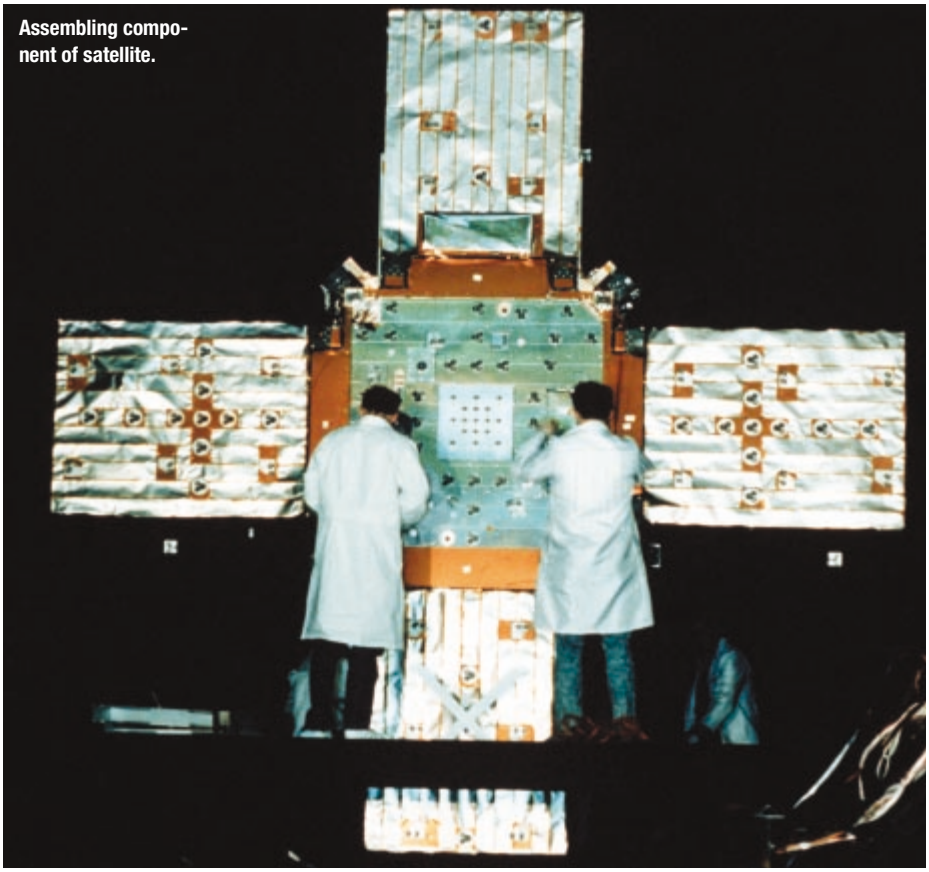
The principal weapon system in the SDS architecture was a constellation of several hundred SBIs. Similar to SPAD, it included large garage satellites with up to ten interceptors and two space-based infrared sensor systems. The boost surveillance and tracking system (BSTS), an Air Force program absorbed under SDI, would detect launches and track missiles throughout booster burn. The space surveillance and tracking system (SSTS) would track buses and then follow warheads once they separated from the buses.

The SDS phase I architecture had two major deficiencies: it was too costly and space-based assets, especially SBI, were vulnerable to Soviet ASAT systems. To overcome these problems, the SDI Organization (SDIO) replaced SBI with Brilliant Pebbles (BP). Since each interceptor had a sensor, on-board computer, and communications capability, it could operate autonomously without the large supporting satellites of SBI. Furthermore, BP interceptors would be mass produced, using off-the-shelf components that were largely commercial grade, making them relatively inexpensive. Moreover, replacing SBI with Brilliant Pebbles meant that instead of dealing with only a few hundred large, lucrative targets (SBI satellites containing multiple interceptors), Soviet ASAT systems would have to find, attack, and destroy thousands of small, inexpensive interceptors. Attacking these interceptors with ASATs was not cost-effective.

the Cold War ended as Brilliant Pebbles was being integrated into the strategic defense system

Because of on-board sensors, Brilliant Pebbles undercut requirements for BSTS and SSTS when it replaced SBI in 1990 and became the principal weapons system in a modified SDS phase I architecture. Since BSTS was originally taken from the Air Force to be part of SDI, and since the service still required an early warning and tracking capability, BSTS and SSTS were turned over to the Air Force and evolved into the current space-based infrared system program.

The Cold War ended as Brilliant Pebbles was being integrated into the strategic defense system architecture. A subsequent review advocated a new focus for SDI—limited missile attacks. In the new world order, it would no longer be necessary to defend against a massive Soviet ICBM attack. The most likely threat against the American homeland would be an unauthorized or accidental attack by one or two hundred Soviet warheads. Another was the proliferation of missile technology and weapons of mass destruction, which made it increasingly important to protect deployed U.S. forces and allied populations and forces from shorter-range missiles.



Assembling component of satellite.

DOD (Michael Savell)

The central element in the architecture would be a thin constellation of several hundred BP interceptors, providing an overarching upper tier to complement both deployed theater missile defenses and a limited national missile defense system. As such, Brilliant Pebbles became the key integrating element of a concept known as global protection against limited strikes (GPALS).

An America-led coalition was fighting a war against Iraq in less than a year. In the midst of that conflict, which featured the first operational engagements between ballistic missiles and missile defenses, the President announced that GPALS would be the architecture for SDI. Following the Gulf War, Congress passed the Missile Defense Act of 1991. This law appeared to support the expeditious deployment of the GPALS system, including Brilliant Pebbles. But it was a compromise between Republican advocates of missile defense and Democratic defenders of the ABM Treaty. In effect, the law gave half a loaf to treaty supporters and half to those who considered rapid deployment of missile defenses to be an urgent national priority—and neither side was fully satisfied.

After it interpreted the Missile Defense Act, DOD pursued a vigorous GPALS program that included substantial funding for the space-based BP system. This provoked a strong reaction from Democrats, who considered Brilliant Pebbles a threat to the ABM Treaty and beyond the pale of the law. When the Democrats gained control of Congress in 1992, they passed legislation that severely reduced spending on Brilliant Pebbles and prohibited including it in GPALS architecture, thereby fracturing an integrated global missile defense concept into separate components for national and theater missile defense.

Post-Cold War Realities

Bifurcation of missile defense, along with elimination of space-based interceptors, became the basic approach to missile defense under President Clinton. A major reason for this tack was the commitment of his administration to the ABM Treaty.

Under Reagan, and to a lesser extent under Bush, the United States attempted to use arms control negotiations to transition from offense-based nuclear deterrence to relying increasingly on strategic defenses. The ultimate goal was eliminating strategic nuclear weapons.

On the other hand, the Clinton administration considered arms control at least as important to guaranteeing the nuclear peace as strategic weapons. According to the head of the Arms Control and Disarmament Agency (ACDA), administration policy sought "to protect us first and foremost through arms control. . . ."[1] Under that position, it followed that strengthening the ABM Treaty enhanced national security.

In line with this view of arms control, ACDA denounced the interpretation by the previous administration of the ABM Treaty, which would have allowed development and perhaps deployment of space-based interceptors. Moreover, since space-based systems were not compatible with efforts to strengthen the treaty, it is not surprising that the Secretary of Defense removed Brilliant Pebbles from the demonstration-validation phase of the acquisition process and reduced it to a technology base program. By the end of 1993, the Ballistic Missile Defense Organization (BMDO), formerly SDIO, was forced to completely cancel the eviscerated program. Paradoxically, the greatest triumph of Brilliant Pebbles came after the death of the program in a joint BMDO–National Aeronautics and Space Administration (NASA) mission.

By January 1992 it had become apparent to SDIO that the agency would not be allowed to demonstrate the effectiveness of the technologies developed under Brilliant Pebbles. Since NASA had earlier approached DOD about the possibility of using SDI-developed technologies in its own program, SDIO agreed to use BP com-

ponents in a space probe known as Clementine. The mission called for the probe to orbit the moon for over two months and then depart the cislunar region for a rendezvous with the asteroid Geographos.

The probe was launched in early 1994 and completed the lunar portion of its mission. But while maneuvering for its flight to Geographos, a computer failure caused an extended burn of the altitude control system, depleting fuel and leaving the vehicle incapable of completing the second part of the mission. Nevertheless, Clementine served as a viable test in which 23 missile defense technologies performed successfully, including many derived directly from Brilliant Pebbles.

Clementine was the high water mark in space-based missile defenses. During the remaining years of the Clinton administration, space-based missile defense programs were largely limited to preparations for a far-term test of a high-power, space-based laser and the development of sensors that could cue ground-, sea-, and air-based missile defense systems.

George W. Bush assumed the presidency determined to deploy effective missile defenses in the shortest possible time. In support of this goal, the Secretary of Defense reorganized BMDO and renamed it the Missile Defense Agency (MDA) to prepare a set of options to reorient the missile defense program. These options were not to exclude ideas that conflicted with the ABM Treaty; they would be judged strictly on their technical merit. Furthermore, to end the bifurcation of missile defense into theater and national systems, a division that seemingly pitted U.S. interests against other nations, MDA would plan an integrated, layered defense to protect both America and its allies against ballistic missiles of all ranges.

The system that emerged from this restructuring divides the missile defense mission in three segments: boost, mid-course, and terminal—the major phases of ballistic missile flight. In theory, each segment could incorporate land-, sea-, air-, and space-based elements in the future. Moreover, all three segments will be integrated into a single ballistic missile defense system (BMDS) through both battle management and command and control systems.

To ensure the best technical and operational options in developing BMDS, Bush withdrew the United States from the ABM Treaty. Now, instead of designing a system to minimize violations of the treaty and then negotiating changes to preserve the agreement (the approach of the previous administration), MDA is drawing on the potential of all systems based on land, at sea, and in the air and space.

to ensure the best technical and operational options, Bush withdrew from the ABM Treaty

Although withdrawal from the ABM Treaty ended the legal strictures on developing space-based missile defense systems, it did not assure that such systems would rebound to the position accorded to them in the SDI program. Indeed, the emphasis of the present administration on early deployment of the most effective defenses possible means that the immediate focus in the program must be on ground-based systems, mid-course and terminal, since work on these systems has been steadily sustained by four Presidents. Thus the first operational system based on work that flowed from the SDI program will be the Patriot Advanced Capability-3 terminal system, which is currently being operationalized. This will be followed by the ground-based midcourse system, which should provide a limited defensive capability in the form of an Alaskan test bed system, scheduled to be operational in late 2004 or early 2005.

Under these conditions, space-based systems have been put on the back burner. The space-based laser program, which included a 2012 space-based experiment under the last administration, has now become a technology program focused on projects related to low power laser applications (tracking, imaging, and weapon guidance) and to high-power technologies that might feed into a future space-based laser project. And work on space-based HTK interceptors is included under a broader research and development project for kinetic energy boost phase interceptors.

Although the concept of space-based missile defenses using HTK interceptors emerged in 1960 from Project Defender, two decades of low-level efforts were required to bring this concept to fruition in the BP interceptor that was integrated in SDS phase I architecture. The technologies developed for Brilliant Pebbles were successfully demonstrated in the Clementine probe after the Clinton administration killed the former program. Thus, in a sense, Clementine was the climax of space-based missile defenses in the United States.

Space-based missile defenses have not achieved a comeback under the Bush administration despite the U.S. withdrawal from the ABM Treaty. Given the potential of space-based weapons as boost-phase missile killers, it seems unlikely that BAMBI-like concepts will completely lose their luster. Rather, they are likely to wait in the wings until better technologies and a new strategic setting call them back to center stage. **JFQ**

NOTE

[1] John D. Holum, "Remarks to a Conference Cosponsored by the Center for National Security Law and the ABA Standing Committee on Law and National Security," June 10, 1994.

Some Propositions on Spacepower

NAVSTAR global positioning system satellite.

DOD

By MICHAEL V. SMITH

At the turn of the 21st century, spacepower remains on unsure theoretical and doctrinal footing. Despite more than forty years as the dominant actor in military space, the Air Force has not found a definitive way of conceptualizing space. It vacillates between the terms *aerospace* and *air and space* to describe operating environments beyond the earth's surface. Indeed, this distinction gives rise to heated debate among the members of two schools of thought. One holds that air and space operations form a single dimension of military power. The other sees them as separate and distinct.

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The case for airpower as an autonomous dimension of military power is convincing and generally understood; however, the same cannot be said of spacepower, especially inside the Air Force. The propositions that follow describe the nature of spacepower and serve as a foundation for a working spacepower theory.

Ten Propositions

Space is a distinct medium of operations. Space is physically separate and quite different from all earthly media. Orbital operations are constrained by the laws of physics, which creates a wall of misunderstanding between space professionals and those who do not understand orbital mechanics.

space professionals must centrally control spacepower to balance scarce resources across theaters

These physical qualities heavily influence operational methodologies and planning for space activities. Most important, space was cast diplomatically as a separate medium during the Eisenhower years. And the international community observes entirely different legal standards for space as well. Every U.S. administration has reaffirmed the belief that it is a separate and distinct operational medium.

The essence of spacepower is global access and global presence. The reason for moving earthly capabilities into orbit is exploiting the global nature of spacepower. Access to denied areas was the initial rationale for reconnaissance satellites, and it is still a compelling motivation. But the ability to conduct missions globally with limited assets is crucial not only for the military and civil sectors but also for the commercial world. In the vernacular of space, *global* means more than access to the entire surface of the earth, as airmen might use the term; it may mean access to all locations simultaneously, in war and peace, such as navigation and communications services.

Spacepower is comprised of a total national space activity. Activity in space outstretched its defense and intelligence roots as states developed civil and commercial sectors. Venturing into space is difficult, and a substantial infrastructure is required to generate programs. Spacefaring is most likely in the case of wealthy nations that have abundant natural resources, a stable political environment, a solid educational system that stresses the sciences, and the political will to make the commitment to a space program over the long term.

Spacepower must be centrally controlled by space professionals. Worldwide missions set off spacepower from other dimensions of military power. Because space assets operate globally, they cannot be managed on the theater level like land forces, which would handicap spacepower in the same way airpower was limited at the outbreak of World War II under the Army. Space professionals must centrally control spacepower to balance scarce resources across theaters. At the same time, space professionals must take charge of the battle for space control rather than leaving it to other commanders with different priorities.

Spacepower is a coercive force. The presence of space assets such as reconnaissance and surveillance satellites influences and will increasingly influence actors who seek to conceal certain activities. This situation arises from the deterrent potential of collection assets that are designed to serve as national technical means of treaty verification. Some actors are likely deterred from certain actions in the presence of spy satellites. Increasingly, spacepower assets are integrating into the sensor-to-shooter loop of combat operations. This development, plus the emergence of weapons in orbit, signals the expansion of spacepower for compellence as well as deterrence.

Many actors can exploit commercial space assets. Commercial vendors who sell military-related space products constitute a new breed of mercenary. Any asymmetric advantage held by the superpowers based on their space prowess is eroding because anyone who can pay the tariff can obtain space support. Military and law enforcement planners must take into account the potential for an enemy to exploit these capabilities.

Spacepower assets form a national center of gravity. More and more segments of society turn to space-based assets, which makes the relatively few satellites in orbit lucrative targets for an enemy with the means to strike them. Although access to satellites is seldom a single point of failure, losing access to the vital information they collect and carry will increase the fog, friction, and cost of operations, which could turn the tide against spacefaring states.

Space control is not optional. A growing reliance on spacepower assets by governmental agencies and the business community makes it essential to secure access to satellite services. It is equally important to deny access to unfriendly users. Because an enemy is likely to compete for relative control of the space medium, states must take measures to secure national interests.

Space professionals require career-long specialization. Spacefaring continues to present daunting technical challenges. Moreover, space operations differ so radically from operations on earth that highly specialized training, recurring education, and career management are required to develop experts.

Space weaponization is inevitable. Wherever humankind goes weapons follow. There are genuine reasons for not weaponizing space, but they fail to take into account the imperatives that often drive nations in ways that are beyond rational thought. When weapons will be placed in space is uncertain, but pragmatists must assume that it will happen—and act accordingly.

Not a Single Dimension

Spacepower directly affects other instruments of national power and increasingly shapes the daily lives of ordinary people. Its military importance is growing because it forms a global informational infrastructure that the armed forces of advanced nations increasingly rely on. In the future, spacepower will likely include counterspace weapons and systems that attack terrestrial targets. Space will become a place to pre-position combat power for immediate execution against terrestrial targets anywhere around the globe.

(continued on page 60)

Military Uses of Space

Attributes of Space Operations

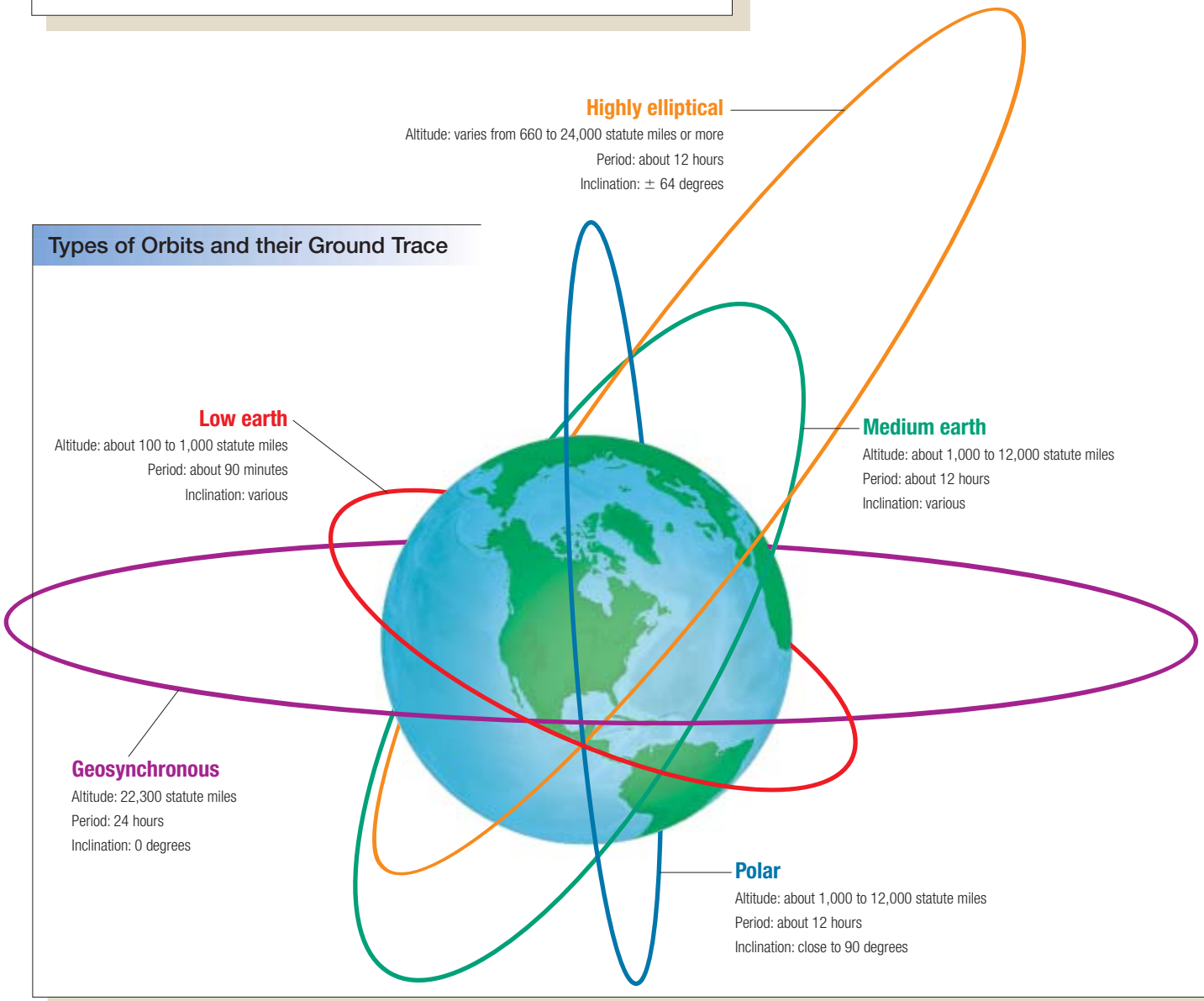
ADVANTAGES

- Global access
  - – High vantage point
  - – No overflight restrictions
- Longevity of systems
- Persistent operations

LIMITATIONS

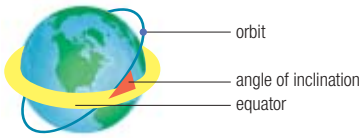
- Inhospitable environment
  - – Difficult and costly to access
  - – Very difficult to maintain or reconfigure systems
- Predictable orbits
  - – May be vulnerable to attack

Types of Orbits and their Ground Trace

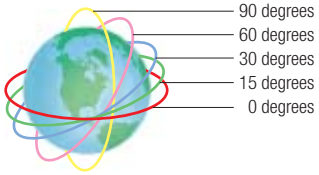


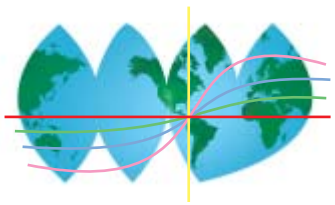
Inclination of Satellites

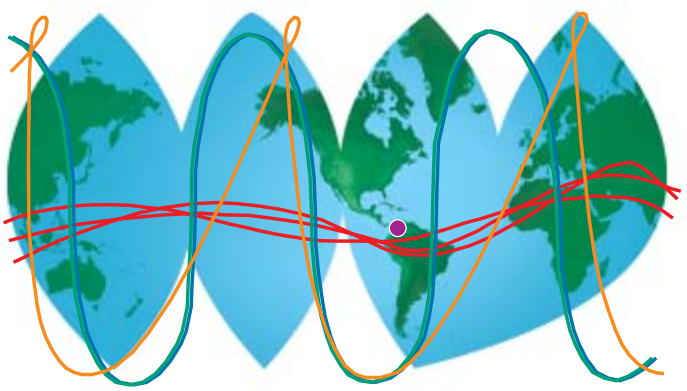
• Angle of orbit relative to the equator



• Comparison of inclination

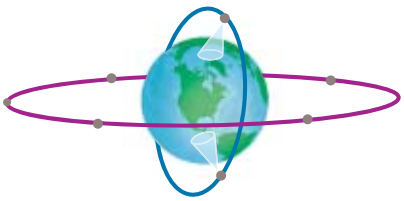






Uses of Satellites

• Intelligence and Weather

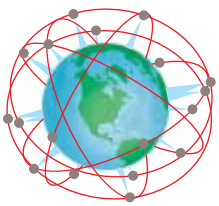


• Reconnaissance

• Surveillance

• Communications

• Navigation



Meteorological satellite atop launch vehicle.

Lockheed Martin

(continued from page 57)

Despite evidence to the contrary, many persist in arguing that spacepower is not separate and distinct from airpower on the theoretical basis that it delivers similar products, as if aircraft can do what spacecraft do. This is not the case. Aircraft cannot survey more than 80 percent of the earth with three vehicles or fly over denied airspace. A few satellites can provide persistent capabilities worldwide. While the global positioning system uses only 24 satellites in its nominal constellation, it has created the first global utility. Some satellites perform intelligence gathering missions similar to those of aircraft, but reconnaissance planes loiter over theater-specific areas while reconnaissance satellites transit the globe in minutes, collecting and disseminating data in virtually every theater along the way. Moreover, basic differences create professional mindsets. Airmen have a theater perspective and space professionals have a global view, as evidenced by the fact that airpower is controlled by theater-level joint force air component commanders while space-based assets are controlled globally by commanders inside the continental United States.

The aviation community has repeatedly tried to make aircraft that can do what spacecraft do. There have been many efforts to develop a space plane, but none has become operational, in part because of technical problems, but mostly because no one could justify the great expense of making an aircraft to duplicate satellite capabilities, with the exception of serving as a reusable spacelift and recovery vehicle. Some argue that America needs a combat-capable space plane to deliver ordnance more rapidly than aircraft without forward bases in the combat zone. These are compelling ends, but justifying the means will likely be as difficult today as it was at the height of the Cold War when such a vehicle was first postulated.

An Independent Theory

A spacepower theory can serve political and military practitioners with a framework for assessing space issues and guide related decisionmaking. It must be rooted in broader theories of statecraft and warfare. Students of spacepower should build, in particular, on *The Art of War* by Sun Tzu and *On War* by Carl von Clausewitz. The former describes the nature of statecraft and war in a world where states constantly compete.[1] The latter work, while often misinterpreted, captures the premise of armed conflict: "War is nothing but the continuation of policy with other means . . . the political object is the goal, war is the means of reaching it, and the means can never be considered in isolation from their purpose."[2] Simply put, spacepower does something in space to support policy. These classic sources and an appreciation of the ten propositions outlined above set the stage for a working theory.

The military uses of space provide global capabilities to assist in achieving political and military objectives. This is an independent dimension of power that can be used alone or in concert with other forms of power to achieve desired ends. Space is an expanse where humans place systems to resolve problems. It begins above the surface of the earth at the lowest altitude at which a

satellite can sustain a circular orbit (some 93 miles) and reaches to infinity. Eventually, man's interests may extend beyond near-earth space. Military spacepower is likely to be used to protect those interests. Someday in the future, populations and political entities may migrate into space as well. But for now, humans live on the surface of the earth, and spacepower in this context refers to terrestrial struggles.

The reason for going into near-earth space is gaining access to regions where terrestrial forces either cannot go or loiter as economically as some satellites. A relatively small number of similar satellites extended in orbital space can survey the entire surface of the earth, which gives space-based constellations the ability to perform missions on a global scale. In the opening years of the 21st century, space missions are primarily informational—by providing command, control, communications, and computer support as well as intelligence, surveillance, and reconnaissance support to terrestrial forces. Land, sea, and air forces also perform such missions, but only space systems (and some terrestrial communications networks) perform them around the globe all the time. These space networks create a global informational infrastructure that links expeditionary forces deployed anywhere in the world and connects them with their leaders at home.

space networks create a global informational infrastructure that links expeditionary forces with their leaders at home

Space-based weapons will not only be used to gain control of space in the future, but against targets on land, at sea, and in the air. With a sustained commitment to technological advancement and investment of resources, space will provide a vantage point from which to observe, support, and influence human events. But space systems will require a vigorous defense.

Satellite and microwave commercial news vans.

U.S. Navy (Dick Cole)

Space Control

The first and most enduring mission of space forces is to gain relative space control over enemies, enabling the space offensive while protecting friendly forces from hostile space actions. This requires continuous situational awareness about what is happening and acting to ensure friendly access to extraterrestrial capabilities while denying the same to any enemy. Control has both defensive and offensive components.

Defensive control must ensure that friendly forces and their political leaders can continue to exploit space. It is necessary to support theater operations where combat is underway and to continue observing activities in all other theaters to assess additional threats requiring diplomatic or military intervention. Space control also enables a state to sustain such services from space as communications and global positioning data, upon which users in all theaters are increasingly reliant. At the same time, commercial assets require protection. Ideally, all satellites should be hardened against attack, but commercial investors are reluctant to spend the money, placing a burden on defense planners to defend commercial systems, which are important to domestic and allied economies.

Enemy counterspace weapons could rapidly destroy space systems. Therefore it is vital to acquire the ability to quickly find, fix, track, target, and destroy counterspace weapons. Such systems may reside on land, at sea, in the air, or in space. It is equally imperative to restore lost satellite capabilities in orbit before their loss affects political, economic, and military operations. Restoration may be achieved by activating in-orbit spares, leasing commercial services, launching new satellites to replace capabilities lost through attrition, or gaining access to allied services. The ability to repair or replace lost satellite ground control systems is also essential, and methods may include transferring ground control responsibility to another location (either fixed or mobile), leasing commercial support, or obtaining ground assistance from allies.

Offensively, space control does not have to be total to be effective. An enemy may have satellites that do not especially affect its warfighting capability. Circumstances and strategy will dictate the degree of offensive space control required. Considerations will be the time and place where control must be gained, how rapidly it is needed, the number of satellites or

Saddam International Airport.

Space Imaging

ground control targets to be negated, how long control must be sustained, and the desired level and reversibility of negation (deception, disruption, denial, degradation, and destruction).

Satellites are global assets whose value is proportional to the interests of their state or nonstate owners. It may be politically untenable to permanently damage an unfriendly vehicle for various reasons. For example, although an imagery satellite may threaten to disclose friendly troop movements in one region, it might perform treaty verification or other missions on the opposite side of the globe. In many scenarios, offensive space control might best be limited to localized and temporary effects.

One way of denying access to space is destroying hostile launch facilities. But an enemy may acquire space lift from other states. Thus the best way of denying space support is negating the satellites directly. Though some satellites may be particularly susceptible to the destruction of ground stations, others may degrade gracefully in the absence of ground control. An enemy could use mobile ground stations for tactically critical space systems that need frequent control from the ground. This fact not only makes targeting ground stations more difficult—it highlights the need to negate unfriendly satellites in orbit. It is also possible to attack space use by jamming or spoofing receivers, which has the benefit of localized and temporary effects. A combination of attacks on all segments of a system—ground stations, satellites in orbit, and user equipment—as well as on their linkages may sometimes be needed to achieve the desired effect.

commanders can allow greater concentrations in theater because space-based assets act as a kind of global sentry

Control will be complicated if an enemy uses launch facilities, satellites, or ground control systems provided by commercial firms, international consortia, or allies. Diplomatic efforts are needed to eliminate third-party support, but friendly forces must be ready to expand the conflict by striking support wherever it originates. If diplomacy fails, and policy does not allow striking third-party targets, an enemy has a sanctuary it will likely exploit.

Situational Awareness

In an era of precision targeting, situational awareness must be equally precise. Bombs are only as accurate as the coordinates available to planners, warfighters, and munitions themselves. Precision targeting is well understood, but the demand for precision intelligence, surveillance, and reconnaissance is not.

Multiple intelligence, surveillance, and reconnaissance sensors in all media characterize the modern battlespace. Some collect signal intelligence while others gather photoreconnaissance data and still others accumulate radar information. Sensors and their operators not only identify targets but also determine exact coordinates. The precision of sensors varies, but airborne devices can be more effective than space-based sensors because satellites are usually farther from targets and satellites in low orbits have relatively short dwell times. Satellites in higher orbits are more distant and generally less able to precisely refine coordinates. Also, satellite sensors degrade over time and there is no effort to keep them in prime condition. Finally, given the relatively small number of satellites in low-earth orbit, continuous coverage is currently impossible. And though aircraft have several distinct advantages over spacecraft in collecting information within theater, data gathered from space is critical.

Space-derived assets offer the first look at the battlespace and help identify targets before they enter the area. As a rule of thumb, intelligence, surveillance, and reconnaissance derived from space are useful in finding 80 percent of targets and can determine their location with 80 percent of the accuracy required for precision strikes. With this information, civilian and military leaders can make decisions on employing forces. The initial look from space may suffice in some cases, but terrestrial assets are usually needed. During combat, space-based intelligence, surveillance, and reconnaissance sensors continue to provide data, filling gaps in theater coverage. Moreover, they can also cue terrestrially-based sensors, as happened during Desert Storm, when missile warning satellites directed Patriot batteries to Scud missile launches.

Perhaps most important, in war and peace, spacepower provides an 80-percent first look on a global scale. It allows analysts to watch the world and report factors that give the flexibility to political and military leaders to employ terrestrial forces more expeditiously and confidently. Spacepower literally watches the backs of forces to make sure no threat is sneaking up behind them. Thus commanders can allow greater concentrations in theater because space-based assets act as a kind of global sentry. Space systems have unimpeded access, and relatively few assets are required to sustain worldwide intelligence, surveillance, and reconnaissance missions.

By increasing the number of low-earth orbiting sensors, improving their capabilities, and developing the means to maintain them, that 80 percent rule of thumb will approach 100 percent. But although space systems will become more capable, they will not replace terrestrial forms of inteligence collection and other functions. Aerial reconnaissance did not obviate the need for land and sea forces to conduct reconnaissance and space assets will not totally usurp such missions.

The Proverbial Toolbox

The synergism created by spacepower and other military forces yields new capabilities. Its continuous global coverage is a new contribution to warfare. The various command, control, communications, computers, intelligence, surveillance, and reconnaissance capabilities—weather observation, missile warning, and navigation broadcasts—provide a distinct informational edge to the military. This advantage will evaporate as other actors on the world stage develop, lease, or borrow similar capabilities.

Landpower, seapower, airpower, and spacepower bring different capabilities to the table. The Armed Forces train in highly specialized ways, the objective being to dominate operations in their respective media. Operations in each dimension require centralized control in coordination with each service to ensure optimum management of resources for joint warfare.

It is a fallacy that airpower missions will eventually migrate to space. This presumes that joint commanders would trade highly flexible organic airpower for less flexible and capable space systems that others would likely manage as global assets. Economic considerations may lead to such a compromise, but a more prudent approach would be to develop robust spacepower capabilities that complement landpower, seapower, and airpower assets. The difference between space and terrestrial systems is that the former provide global access and presence. Terrestrial systems must be developed as theater assets to fill voids in coverage and offer more flexible and precise intelligence, surveillance, and reconnaissance as well as strike capabilities.

Assuming that space systems will eventually be able to target any location on earth with conventional bombs or other weapons does not mean they should simply replace aircraft for such missions. Space operations are expensive, and economic considerations alone will likely require air delivery of many munitions. Exceptions include times when cost is not a consideration, such as combat in denied areas, situations when aircraft cannot quickly respond, targets best engaged by specialized weapons delivered from space, or conditions where surprise is vital.

While some overlap exists between spacepower and other dimensions of military power, this is a prudent investment. Just as bombers, submarines, and missiles were designed to prevent an enemy from gaining a significant advantage if it countered one leg of the triad during the Cold War, redundancy today prevents an enemy advantage should space-based systems or terrestrial forces be countered. Some adjustments in force structures will be required as space capabilities become stronger, but no mission should be moved entirely to space.

Combined Arms

In peacetime, spacepower assets monitor the globe, helping to identify and characterize potential threats. When a danger arises, political and military leaders can send terrestrially-based sensors into the area for a closer look. If hostilities break out, space forces will gain the degree of space control needed and help in providing intelligence, surveillance, and reconnaissance and strike capabilities. They must watch the rest of the world, looking for tipoffs, warnings, and indicators of other threats in any theater.

Force application from space will take many forms, but it seems likely that space-based weapons will fill specific niches, ideal for some missions during certain phases of operations. No claim is made that spacepower by itself can be decisive in conventional warfare, but it may help set the conditions for victory under some circumstances. Conversely, if spacepower forces are defeated, that could turn the tide against friendly forces. There may be certain forms of limited warfare wherein information gleaned from space or strikes delivered from space may achieve the political and military aims of an operation.

Analyzing spacepower reveals that air and space—or airpower and spacepower—differ. It also provides a foundation for a working theory of spacepower, which supports the principles of statecraft and warfare. Moreover, it complements rather than competes with other dimensions of military power. The Nation has much unfinished business in building spacepower, especially in matching the ambitious vision presented above. As the Air Force matures in its role as the executive agent for military-related spacepower, it should be expected to promulgate spacepower theory and doctrine separate and distinct from its treatment of airpower. JFQ

NOTES

[1] Sun Tzu, *The Art of War,* translated by Ralph D. Sawyer (Boulder, Colo.: Westview Press, 1994).

[2] Carl von Clausewitz, *On War,* edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), pp. 69, 87.

Navstar global positioning system.

Boeing

Globalizing **Space Security**

By SIMON P. WORDEN *and* JOAN JOHNSON-FREESE

The Nation is losing the information war against global terrorism. Many audiences abroad regard the United States as the aggressor despite the unprovoked attacks visited on New York and Washington in September 2001. Moreover, most of the Islamic world is growing increasingly hostile to Washington and its agenda. Even traditional allies and friends have responded negatively to the perceived American intent of going it alone. One key factor is the widening gap between U.S. and foreign military capabilities, which is largely attributable to superior and more integrated use of global information, in particular space-derived information.

The United States has shown little inclination to work with allies to integrate the military uses of space in multilateral planning and operations. The well-financed European effort to build an independent space-based global

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U.S. Air Force (Karen F. Silcott)

navigation system (Galileo) is a clear reaction to U.S. intentions regarding the global positioning system (GPS). Space and information can be forces of integration rather than the causes of fragmentation in global security. They can present security opportunities. Internationally, this debate is especially important given the U.S. commitment to missile defense and military space programs and resulting perceptions abroad that the Pentagon is working to acquire sword and shield capabilities in space.

Globalization

If globalization is not the dominant trend of the 21st century, it will only be neglected at great peril. As an integrative force it creates networks that draw individuals, organizations, and nations closer together while simultaneously driving them toward diminishing units of identification. The major difference between globalization today and in the past is the role of information technology, which increases both the influence of networks and speed of change. Moreover, technology democratizes information, providing access to previously sequestered material. Transparency becomes another dual-edged sword demanding the attention of security planning.

Few factors dominate the security environment like globalization. But the term has become a buzzword that ultimately adds little value to discussions. Immediately following the collapse of the Soviet Union and renaissance in Eastern Europe, globalism—or globalization—had essentially an economic connotation, signifying a rush to create an integrated market-oriented system. While the network had developed earlier, between 1989 and 1991 the last major holdouts not only became true believers in market economies but devout capitalists. Before long, however, the downside of economic integration began to appear.

the need to include security in the globalization equation has become evident

Though initially regarded as a positive force that would level the economic playing field and dissolve national barriers, globalization sometimes actually widened the gap. Moreover, posturing for success in a globalized world required obeisance to international institutions and norms, which were often viewed as U.S.-sponsored and even neocolonialist, especially when anticipated benefits went unrealized. And when successful, costs to national culture and sovereignty were often high. Globalization intensified a fragmenting nationalist counterreaction.

The need to include security in the globalization equation has become evident. Nations are no longer the only actors involved in security. In the global war on terrorism, the United States is focused on al Qaeda, a group of individuals. Globalization gives rise to economic, cultural, political, and security considerations, both positive and negative. The most useful definition of globalization may be the simplest: the impact of events beyond national borders and often regions.[1] With the primary difference in globalization today being information technology, rapid change becomes critical.

Many terrorists do not fight for recognition or political goals. They are instead apocalyptic or nihilistic, negating the premises of deterrence. In addition, rogue states often seek to perpetuate regimes rather than serve national interests, ignoring the balance of power premise. Such actors are technologically astute and have been empowered by previously unavailable information through the Internet and other advanced communications capabilities, particularly those relying on space assets. Democratization of information provides unimaginable opportunities for linkages, but not without becoming a transnational threat. An unprecedented electronic attack in October 2002 temporarily crippled nine of thirteen worldwide servers critical to the Internet, serving notice that cyberterrorism is real and that cooperation to thwart it is both necessary and possible. The attack was halted in an hour through cooperation among root server operators and authorities.

Globalization can become a complementary factor in security planning. Shared interests in maintaining the Internet, for example, have created a large unofficial and official coalition of parties for which uninterrupted access is vital. The United States serves as the link among all cyberspace-vested interests and other technically based domains, including space.

Satellite operations center, Schriever Air Force Base.

U.S. Air Force (Lono Collars)

Protecting space assets can become an international rather than an exclusively U.S. interest. With its overwhelming capabilities and advantages for force enhancement, America is viewed with mixed feelings by many countries. Potential enemies are keenly aware that reliance on space assets makes the Nation vulnerable to interruption. Global positioning provides an interesting example in this regard. With airlines dependent on space capabilities for navigation, and diversified civilian utilization expanding exponentially, the system serves as a global utility that warrants international protection. Few countries besides the United States, however, have the capabilities to defend it.

Integration

Nations must cooperate more actively to thwart the dark side of globalization, and they must work not only with each other but also with the private sector. Multilateralism is the only option, but network-centric concepts and plug-and-play assets are more elusive.

The gap in space-based assets among nations presents special problems: interoperability, vulnerability, and disparities in military capabilities. The Japanese investment of some $2 billion in an information gathering satellite system, which provides one-meter resolution images (the same as commercial sources), demonstrates independent decisionmaking. Distrust among allies has reached such a level that Europeans are working to initiate at least one Galileo signal that could overlay and interfere with U.S. military signals. Finally, vulnerability also means that America has the greatest interest in protecting space assets, leading to further resentment abroad over the implied movement toward weaponizing space.

A new approach to protecting space assets seems warranted. Ideally it would contribute to multilateralism and increased interoperability. Two critical factors in exacerbating the gap between the United States and other nations have been technology transfer concerns and economics. With advances in microsat technology and resulting reduced costs, there may be opportunities to work together in space, a win-win formula for both America and its partners.

Emerging Capabilities

The Internet became the most significant global utility in the last decade. It gave rise to two issues: the unclassified (versus classified defense only) system, which is an indispensable part of national security operations, and the increasing potential of wireless accesses.

While U.S.-only secure Internet remains essential to military operations, its very classified nature and nonaccessibility to allies have meant increasing military use of the unclassified Internet. Critical functions such as logistics are conducted via this link, which is used for virtually all allied coordination. DOD Internet concerns have grown. A joint task force was organized in 1999 for computer network defense under U.S. Space Command. In 2002 this organization was redesignated Computer Network Operations (JTF/CNO), given added responsibility for network attack functions, and transferred to U.S. Strategic Command.

The primary function of JTF/CNO is protecting Internet use within DOD. As threats such as computer worms and viruses increase, it has instituted increasingly vigorous defenses. But the organization has two drawbacks. First, though it interacts directly with the National Infrastructure Protection Center, it is not charged with protecting non-DOD channels and systems. Moreover, many of its methods would be considered intrusive or totalitarian to commercial or public Internet systems. Second, JTF/CNO is not involved with coalition-wide use of or defense of the Internet. Meanwhile, global terrorists have increasingly turned to the Internet as the command and control and recruiting tool of choice. Organizations such as al Qaeda have used it to circumvent efforts to crush them. Moreover, Web sites that recruit terrorists have remained online by hopping from nation to nation and provider to provider.

One major development in expanded Internet access that promises both great opportunities for information operations and potential pitfalls is the growth of systems linking to the Internet via wireless connections such as cellular telephones or other broadcast signals. Many of these access links run through or totally rely on space-provided communications.

Global time standards. Most experts regard global positioning as a central global utility. However, its value as a global time standard rather than as a navigation aid is more important. It is virtually the only global source for accurate timing. An error broadcast over one satellite in 1996 for a few seconds caused massive cell phone outages across the eastern United States. Multiplexed systems such as telephones require accurate timing to calculate exactly when to send signals in a given direction and on which channel. The precision of the timing signals at send-and-receive locations contributes to the efficient use of communications channels. Timing errors at one site can disrupt an entire well-oiled communications system.

employing space assets to gather information in denied areas was an important feature of the Cold War

With increasing bandwidth demand on existing channels, improvements in efficiency have great economic payoffs. Future global positioning systems with prospective improvements in timing accuracy can add one to two orders of magnitude and can significantly increase economic returns. Not just cellular communications systems but the Internet itself relies on accurate timing. If accuracy increases two orders of magnitude to a tenth of a nanosecond (one ten billionth of a second), a radically different and more efficient Internet becomes possible, with the entire world linked to a single massive computational web.

The increased dependence on accurate timing also means a greater economic vulnerability to outages—accidental or deliberate. For example, the Leonid meteor storm that occurs every 33 years last peaked in 1999. It had the potential to knock out much of the global positioning constellation, which would have caused a massive disruption of life on Earth.

Dependence on global positioning for precision guided munitions is a decisive advantage. Consequently, special new military-only signals are being deployed on satellites that are relatively resistant to conventional interference. However, because the Armed Forces rely heavily on global positioning signals, the United States has resisted involving foreign actors—even its most trusted allies.

Global communications. The original global utility was satellite-based communications. While much high bandwidth international communication travels via land and undersea optical fiber cables, satellite communications systems are significant for two applications. The first is bandwidth on demand for short-term needs and the second is free-space communications where little or no infrastructure exists. Such communications are particularly important operationally.

It is significant that new global communications systems are direct broadcast radio systems. The Asian and African service of Worldspace has great potential as an influential tool in the global war on terrorism. Beyond the control of local authorities and also difficult to jam, the distribution of Worldspace direct broadcast receivers to provide balanced news and globally-oriented distance learning programs has utility in combating terrorism in remote areas.

But these commercial space systems are vulnerable. The accidental loss in 1998 of a single pager satellite halted much of North American electronic commerce for a few days because not only were pagers inoperable, but also services such as credit card payment systems at service stations. Moreover, the Armed Forces rely on commercial systems for long-distance communications, which could encourage an enemy to attempt denial.

Situational awareness. Employing space assets to gather information in denied areas was an important feature of the Cold War. With technological advancements, a growing commercial

Tactical communications shelter.

U.S. Army (Claude Stallings)

constellation of optical imaging satellites has been developed. These systems can now obtain sub-meter resolution imagery comparable to aircraft and overhead imagery formally monopolized by the superpowers. DOD is the biggest consumer of these capabilities. Conversely, the government is worried about enemy access to such data and has utilized multiple approaches to avoid unwanted dispersion, from legal restrictions and shutter control to buying up all available imagery. However, as foreign suppliers proliferate, particularly in the all-weather, day/night synthetic aperture radar regime, these maneuvers will likely be ineffective in denying information to an enemy.

Air Force space surveillance network and contributing sensors monitor and obtain virtually all Earth orbit event data. This information is vital in protecting assets and determining the status of foreign space systems in distress. Other nations, notably Canada, France, and the United Kingdom, are developing space tracking systems. Space-based sensors are needed to acquire optimal space situation awareness. Some users, such as Canada, are planning surveillance systems.

Situational awareness includes detecting and tracking hazardous near-Earth natural objects such as asteroids. Currently, the most productive resource is a refitted military space surveillance sensor. Systems capable of searching for and detecting asteroids can also be used to locate Earth-orbiting satellites.

Some thirty objects approximately a few meters in diameter strike the Earth's atmosphere annually and release energy comparable to nuclear blasts of several kilotons. As nuclear weapons spread there is concern that nations such as India and Pakistan, both nuclear armed and lacking sophisticated sensors to distinguish between nuclear blasts and asteroid impacts, might mistake a natural explosion for an attack, triggering a nuclear exchange. The United States is the only nation that possesses sophisticated space-based sensors able to rapidly distinguish natural from man-made explosions in the upper atmosphere. There are no provisions for sharing such data.

Access to space. Getting capable systems into space has been expensive until recently. Only well-funded government efforts could field launch systems because each launch costs tens of millions of dollars. Corresponding satellite costs for deployed systems ran to hundreds of millions of dollars. With such large investments there has been little incentive to enter into cooperative ventures.

Access to space is growing with the emergence of so-called microsatellites. These systems weigh only tens to several hundred kilograms and usually cost under $10 million to develop and build. Most can ride as auxiliary payloads on large primary launches, adding as little as $1 million per launch. The most impressive development of this technology has been achieved by the Space Centre at the University of Surrey. This facility has built and launched over 25 microsats performing a range of scientific missions, including Earth surveillance, and it markets affordable capabilities to nations such as Algeria, Chile, Egypt, Malaysia, Nigeria, and Taiwan.

One growing concern about microsat technology is its potential to interfere with the use of space by other nations. China has worked closely with the University of Surrey and has also developed its own capability. Beijing has suggested that it might use this technology to deny the United States from using space in a conflict. Other nations could develop similar capabilities. And microsats are difficult to detect and track because of their size. Any enemy which possesses them could mount an effective surprise denial of essential commercial and military space resources.

Space Threats

The political dimension is a significant concern to space professionals. National security space efforts were highly classified throughout the Cold War. Near the end of the Soviet Union, the Strategic Defense Initiative, including the proposed use of space-based missile defenses, caused controversy over the military use of space, particularly on weapons. Many members of the national security space community realize the advantages of space for security purposes yet are fearful of public outcry. Extensive exchanges with foreign partners about routine use of space to support security operations would be inherently less classified and thus relatively open to public discussion. Foreign cooperation with the Armed Forces is likely to generate even more opposition since people abroad are more antimilitary on space issues than those at home.

it may be time to use space cooperation as a key element in future influence activities

The United States enjoys a virtual monopoly in the use of space for military operations and almost total dominance over Internet use. This offers an easy means to reconfigure space and information systems. Since capabilities such as global positioning have a large economic impact, international discussion of what is actually an American military system would only slow decisions and constrain flexibility, another reason the military has avoided cooperative space efforts.

Preventing hostile use of U.S. space systems is one of the four pillars in the emerging field of space control, along with space situational awareness, protection of friendly assets, and denial of enemy use of their own space systems. It is generally thought to be unwise to assist other nations or groups in this effort. With experience in the use of space systems proliferating, the difficulty of preventing hostile exploitation grows—an added incentive to eschew international cooperation on use of space data for security purposes.

Another reason to avoid space and cyber systems cooperation is the economic argument. The United States has seen its competitiveness erode across the aerospace industry. International cooperation invariably leads to foreign technology development that in turn can lead to commercial competition.

Finally, there is the issue of secrecy. The military seeks to preserve its advantage in space through strict classification procedures and sharing information on a need-to-know basis. Because space information is critical in denied areas, it is among the most secret of U.S. capabilities. The National Reconnaissance Office, which safeguards space intelligence data, remains among the most powerful agencies for maintaining classification on space capabilities. Similarly, the organization with responsibility for much information intelligence, the National Security Agency, strictly controls emerging cyber capabilities.

Opportunities

Whereas much of the attention in the past on the military use of space has been placed on supporting military operations, the situation is changing rapidly. With the advent of U.S. Strategic Command and its focus on global missions, perspectives on space and information systems must also change. Influence in military affairs was often gained through high-technology cooperation, which involved high-performance aircraft. Space cooperation was generally not considered within most partnerships because of both high costs and security sensitivities. That could change with the proliferation of low-cost microsatellites. Recent thinking suggests that it may be time to use space cooperation as a key element in future U.S. Government influence activities.[2]

One area of potential cooperation is protecting global utilities because they are critical to the international economy. The Internet is a good place to start. Threats to it abound and global calls for action grow with each new worm or virus. As noted before, DOD has developed a reasonable regime for protecting its cyber systems. But to safeguard the American economy, the measures needed are neither available nor generally accepted because of their intrusiveness. Almost no regimes exist to protect the Internet, though there has been consideration of such arrangements. The use of cyberspace by terrorists conjures up wider concerns. It may be feasible to consider cooperation in Internet security as a bilateral and multilateral issue rather than a law enforcement matter. That could circumvent subsequent difficulties by establishing a genuinely global regime at the outset and serve as a template for space cooperation.

Global communications circuits have already come under attack. America must cautiously protect them in order to deny use of global and regional communications to an enemy. One limited option is reaching agreements on defensive schemes, perhaps including on-orbit arrangements such as mandating that commercial payloads carry routine attack and interference sensors.

The most critical capabilities to protect may be global positioning, navigation, and timing networks. Only the United States and Russia maintain them, with Galileo to follow within the next decade. Defending these signals—including when and to whom service should be denied—could be a crucial bilateral concern.

Combating Terrorism

The nature of the global war on terrorism demands worldwide capabilities to respond. It requires the close

Tethered picosatellites.

Aerospace Corporation

integration of global surveillance systems, including the Internet, with local and regional information systems. Local governments that may be reluctant to cooperate often control the latter systems. Global surveillance systems, especially space-based, can be effective in detecting terrorist activities. Moreover, the availability of such systems to local governments can be a strong incentive for cooperation. It would be sensible to consider new low-cost space-based surveillance systems that are less capable but have more comprehensive coverage. A network of antiterrorist sensors would be bilaterally negotiated. The current U.S. early warning regime involving shared missile launch warning data has been an effective pathfinder which has gained influence with minimal threat to national security.

New systems that survey large terrestrial areas and provide unfettered information access from space also have economic benefits. Direct access and interaction with the global information grid opens opportunities for economic development. Collaborative efforts in space have been seen in the past as dangerous to American interests. However, as the successful marketing of microsat capabilities demonstrates, far from migrating capabilities overseas, joint ventures result in greater product use and growing markets for all concerned.

Of particular importance to long-term global stability is the need to integrate isolated areas into the global economy, particularly those of the Islamic world. While mere access to the Internet and modern education may not cure this problem, it will help. Sharing and even providing access to the global information grid could also contribute to a long-term solution to terrorism by promoting economic development and opportunities for many regions around the globe.

Force Multiplier

The military use of space primarily provides a force multiplier for other systems. Direct communications, surveillance, intelligence and targeting, weather, and position, navigation, and timing are key advantages for the Armed Forces. But global issues demand global responses. It is in the national interest to seek means to provide space and information force multipliers to allies. Developing low-cost space systems and access through microsatellites and leveraging commercial capabilities can provide others most of the advantages enjoyed by the United States.

Some caution that encouraging even close allies to strengthen their use of high-technology force multipliers such as space could backfire. Transferring systems could threaten American lives. But it is important to note that the Nation is likely to expand its control over space and cyberspace in a crisis. Thus it is improbable that any ally will have access to sophisticated information if the United States deems it a threat to national security.

Planetary Defense

Some consider the ultimate danger to mankind to be near-Earth asteroids. The impact of a 10-kilometer diameter asteriod 65 million years ago wiped out the dinosaurs and 90 percent of the other species on the planet. Global concern over this threat, fueled by blockbuster movies, has increased the call for action. The possibility that one of the numerous small annual impacts on the upper atmosphere may be mistaken for a nuclear attack adds to the anxiety.

The United States is unique in the world in being able to address the threat of asteroids. It operates the Air Force space surveillance system, the only comprehensive system of its type. DOD space-based early warning sensors already gather data that distinguish near-earth asteroid impacts on the atmosphere from nuclear detonations. Finally, the capability to deflect objects on a collision course with Earth is under development for other military missions.

The foremost need is surveying the skies for threatening objects. Systems to track satellites can also detect and track objects. If the United States assumed the lead in a project to increase these capabilities, it could not only leverage foreign efforts—which are growing because of public fear of asteroids—but also maintain a lead in space situational awareness.

Space and information are the first authentic global capabilities. Security is a global as well as regional or national concern. The establishment of U.S. Strategic Command with oversight for these capabilities, along with other worldwide military assets, recognizes this reality. Global space and information capabilities are essential to solving these problems. A cooperative approach on the part of the United States to their development and employment is essential to building a coalition to meet common threats all nations face. **JFQ**

NOTES

[1] Franklin Kramer, "Is Security Possible in a Globalized World?" *U.S. Naval Institute Proceedings,* vol. 27, no. 10 (October 2001), pp. 50–52.

[2] Stephen N. Whiting, "Policy, Influence, and Diplomacy: Space as a National Power Element," masters thesis (Maxwell Air Force Base, Ala.: School of Advanced Airpower Studies, June 2002).

Finding a Path to Spacepower

Delta II soaring over Florida.

U.S. Air Force (Lee A. Osberry, Jr.)

By JOHN M. LOGSDON

Although there has been considerable activity among specialists in national security space since the Bush administration took office, there has only been limited debate on space weapons and their effects. Decisions regarding spacepower capabilities are important domestically as well as internationally and should be made only after thoughtful analysis and discussion.[1]

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Why the Concern?

The report issued in January 2001 by the Commission to Assess U.S. National Security Space Management and Organization, chaired by Donald Rumsfeld, focused on how best to assure that the United States got maximum national security value from its investments in space capabilities. It was careful in its discussion of space weapons but recommended that the United States "should vigorously pursue the capabilities...to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against

U.N. Conference on Disarmament.

AP/Wide World Photo (Donald Stampfli)

attacks on U.S. interests." To those opposed to extending armed conflict into space, the report seemed to be a call for movement toward making outer space the next battlefield.

This was a plausible interpretation. In the years preceding the commission's work, there had been a high level of advocacy of the potential of space capabilities and the military power they could provide. Force application capabilities were a central focus of this advocacy. In 1996 U.S. Space Command issued *Vision for 2020,* which projected that "during the early 21st century, spacepower will . . . evolve into a separate and equal medium of warfare."[2] Two years later, the command released a long range plan that dramatically portrayed how space-based capabilities, including force application systems, are key to national security objectives and could be used to disable or destroy enemy space systems. The report noted that force application systems based in space could also be available for strategic attack on ground-based targets. In the same year, Senator Robert Smith staked out a position as a congressional advocate of spacepower, stating "America's future security and prosperity depend on our constant supremacy in space."[3] Smith's call for a separate military service dedicated to spacepower led to establishment of the Space Commission. In the private sector, the Center for Security Policy took the lead in pushing for stronger national security space capabilities in the final years of the Clinton administration. To the arms control community and others opposed to moving conflict into space, the report of the Space Commission seemed a logical extension of those arguments; it supported developing space weapons and was closely linked to the highest levels of national security policy.

recently a number of public policy centers have added space weaponization to their agendas

Spacepower advocates pretty much had the stage to themselves at the start of 2001. The opposition to weaponization was primarily on the instinctive level. In the United States, there was no organized criticism or in-depth thinking on the validity or wisdom of spacepower advocates. It was at least reasonable to conclude that the George W. Bush administration would indeed move quickly toward enhancing spacepower, going beyond traditional space support and force enhancement missions to increased emphasis on space control and even force application from space. Given these factors, it is not surprising that those people in the security policy community traditionally skeptical of increasing military capabilities as the best approach to conflict resolution, became concerned that the Nation would pursue space weaponization without challenge. They have now mobilized to present that challenge.

Thinking About Weapons

Recently a number of public policy centers have added space weaponization to nuclear proliferation and ballistic missile defense on their agendas. These groups traditionally focused on diplomatic, legal, and multilateral approaches to international security affairs rather than the development of unilateral military capabilities. Among them are the Council on Foreign Relations, Eisenhower Institute, Federation of American Scientists, Henry L. Stimson Center, Cato Institute, Center for Defense Information, and Monterey Institute of International Studies.

In addition, some members of Congress have become concerned about the implications of weaponizing space. In 2001 and again in 2002, Representative Dennis Kucinich introduced the Space Preservation Act, which called on the President to "implement a ban on space-based weapons . . . to destroy or damage objects in space that are in orbit, and immediately order the termination of research and development, testing, manufacturing, production, and deployment of all space-based weapons of the United States."

Other Space Priorities

As efforts to assess space weaponization reach fruition, an informed discussion on future national security space policy will become more likely. Just as a loyal opposition has emerged, spacepower advocates have been

Unloading satellite from C–17, Kennedy Space Center.

NASA

silent. Senator Smith was defeated for reelection in 2002, and the last Center for Security Policy statement on space-power was issued more than two years ago. Few senior officials or military officers have been willing to discuss questions on space weaponry in public. With only one side participating, there is no debate.

There are understandable reasons for the official silence on longer-term security space issues. As Secretary Rumsfeld has remarked, the Space Commission report was not primarily about space weapons, but about how best to organize and manage national security space efforts. In response to the report, the Air Force has been designated the executive agent for space, with the Under Secretary of the Air Force, Peter Teets, taking the lead in shaping an organizational structure to integrate the best aspects of Department of Defense and National Reconnaissance Office (NRO) practices and programs in support of national security and warfighting objectives. Given the entrenched nature of the agencies involved, this is proving to be a daunting task and it will be difficult to assign priorities to long-run doctrinal and capability issues until the success of the organizational transitions now underway becomes clearer.

There are also major problems in the short run with key national security space programs. Future imagery architecture of NRO and DOD space-based infrared systems have encountered cost, schedule, and technical problems. Moreover, operators of the Delta IV and Atlas V launch vehicles, which are intended to provide assured access to space, have sought government support to compensate for the collapse of the commercial launch market. Dealing with these issues has required an investment of time and effort by Teets and his colleagues. In addition, they seem to have raised questions in the mind of the Secretary of Defense on the wisdom of such dependence on space systems, given the problem of achieving their operational status on schedule and within budget. A recent DOD task force chaired by Thomas Young, a retired industry executive, has addressed both the programmatic problems and the issue of future dependence.

Beginning the Debate

The silence regarding future planning on the part of the national security space leadership appears to be ending. In particular, Teets has begun to

speak out on the importance of superior space capabilities to meeting national security needs, addressing issues related to the exercise of force application as part of maintaining space control. For example, in fall 2002 he told the Air Force Association:

The need to continue our thinking about space control is not just doctrinal rhetoric, but military reality. Controlling the high ground of space . . . will also require us to think about denying the high ground to our adversaries. . . . The mission of space control has not been at the forefront of our military thinking, because our people have not yet been put at risk by an adversary using space capabilities. That will change.

He also noted the need to apply the new capabilities to every possible form of warfighting and asked: "Are there ways we can use space capabilities to affect the decisionmaking cycle of an adversary, or produce other effects to achieve campaign objectives in ways air, land, and sea forces cannot?"[4]

With Teets in a leadership position, advocates of enhanced spacepower appear ready for public exchange. Many who are skeptical of space weaponization are also reaching preliminary conclusions and will soon seek to gain broader attention. Thus coming months may finally bring what Theresa Hitchens of the Center for Defense Information has called "one of the most important global security policy debates of the 21st century . . . whether the United States needs to develop and deploy space-based weaponry."[5]


First lunar landing, 1969.

NASA

no other significant international agreements limit stationing force application capabilities in space

International Dimension

Space weaponization is not just a national security policy issue but a global concern. The Outer Space Treaty of 1967 prohibits stationing weapons of mass destruction either in space or on celestial bodies, but it is silent on other weapons in orbit. The ABM Treaty of 1972 banned the testing or deployment of missile defense components or systems in space but is now defunct. No other significant international agreements limit stationing force application capabilities in space.

In the past several years, a number of international nongovernmental organizations have studied the issue, stimulated by their understanding of U.S. plans as set forth in Space Command documents and other statements and by the deadlock related to steps to prevent an arms race in outer space proposed in the U.N. Conference on Disarmament in Geneva. That issue has been on the conference agenda since the mid-1980s. In recent years, China and Russia have advocated banning space weapons. Moreover, Canada has taken a leading role in support of a ban. The United States has held to its position on the grounds that "existing multilateral arms control regime adequately protects states' interests. . . . There is simply no problem in outer space for arms control to solve. . . . We see no need for further outer space treaties."[6] Since any action by the Conference on Disarmament requires the agreement of all participants, the U.S. position has effectively blocked movement there on the space weapons issue.

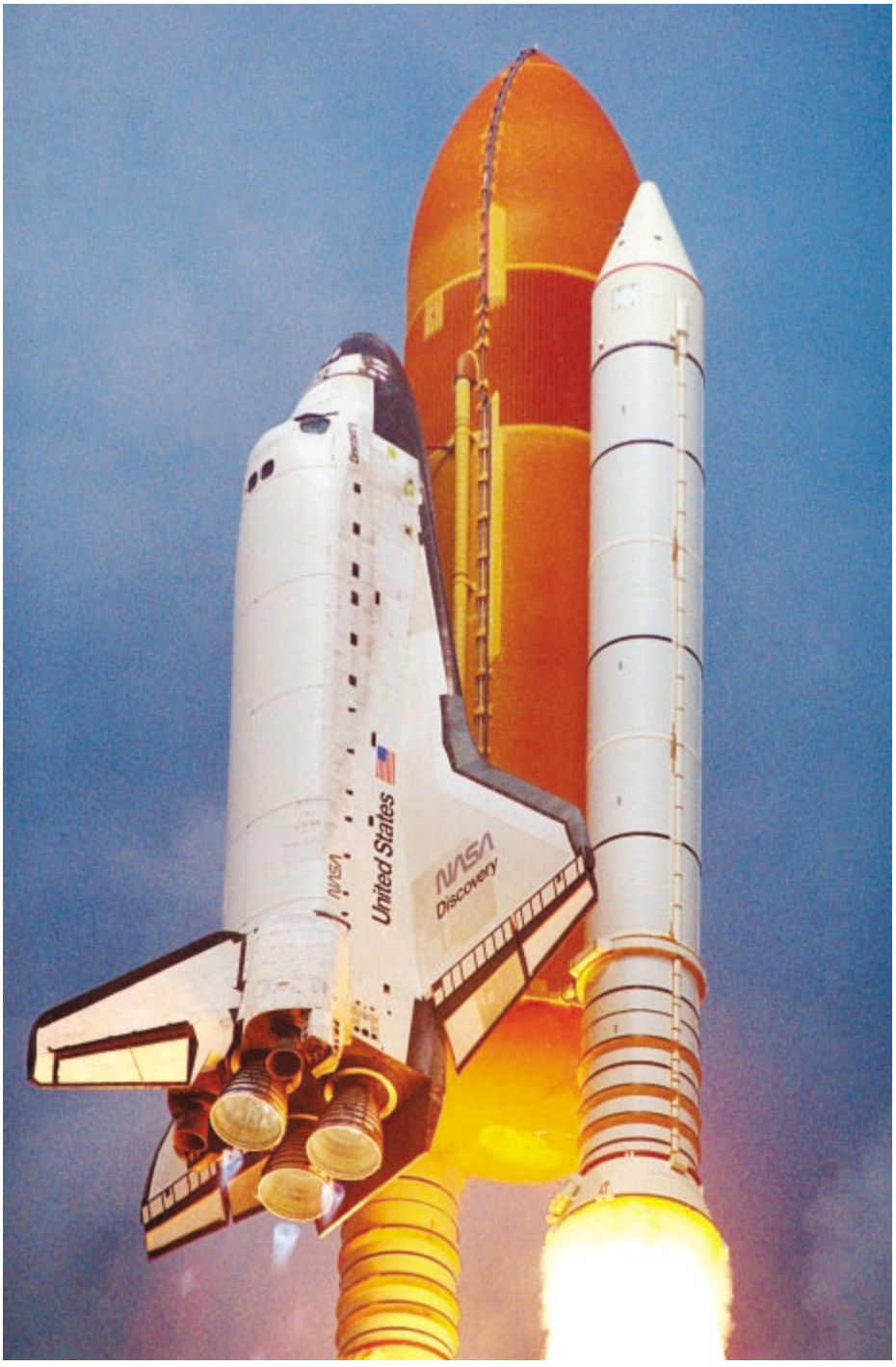
The U.N. General Assembly has passed an annual resolution in the past several years that calls on nations to avoid an outer space arms race. These resolutions, which express the views of members but have no legal standing, have been approved with an overwhelming margin, usually with no opposition and only the United States and Israel abstaining.

The Space Commission report called on the U.S. Government to "participate actively in shaping the [international] regulatory and legal environment" and "review existing arms control agreements in light of a growing need to extend deterrent capabilities to space." But Washington has thus far resisted attempts to begin discussing the regulation of the various uses of space, including as a medium for projecting national power.

Other nations could begin negotiating a new regime for outer space over U.S. objections to pressure Washington into participating. The opponents of space weaponization, assuming that agreements in the framework of the Conference on Disarmament are impossible since the United States can block action, have suggested a process similar to that which led to the treaty banning antipersonnel landmines, which was signed in December 1997 by 121 nations. That process was characterized by a partnership among governmental and nongovernmental actors and multilateral negotiations outside the framework of the conference. If such a process emerged at the initiative of antiweaponization interests, the United States would have to participate in the negotiations, as recommended by the Space Commission, or remain outside of the process. If Washington took part in discussions and eventual negotiations on an international space regime, it could influence the outcome in a manner that is consistent with national interests.

Issues for the Agenda

What might be the leading issues in a debate over space weaponization? First, priority should be given to understanding, in the context of the next 10–25 years, how actual decisions to develop and deploy force application capabilities might be made, and then assessing the positives and negatives of specific decisions. This is preferable to arguing from unexamined assumptions, as both advocates and opponents have too often done.



NASA

One such assumption is that space weaponization is inevitable, and thus the United States should act now to ensure that it is first to develop space weapons. An opposing assumption is that it is in the national as well as global interest for space to remain free of armed conflict. Individuals and organizations holding strongly to either position are unlikely to be productive participants in discussing how best to proceed.

Those observers who hold more nuanced views of the relationship among space weapons, spacepower, space superiority, and national security policy should debate whether and at what pace the United States should develop and deploy antisatellite weapons and space-based force application capabilities. Candid exchanges may reveal whether there are achievable international agreements that might be preferable to unilateral space weaponization.

There appears to be time for debate. One analysis of the military use of space concluded:

there is a better than even chance that the primary use of space will remain force enhancement through 2020–2025 . . . the strategic logic of spacepower argues that weapons will one day be based in near-Earth space because nations will eventually feel compelled to defend their strategic interests there. . . . The odds are that this logic will not drive nations, including the United States, to deploy weapons in orbital space by 2025.[7]

If this judgment is valid, it is appropriate to proceed slowly in developing space weapons capabilities as alternate approaches are explored. Other aspects of space superiority—such as improved situational awareness—should have higher priority.

Two paths could lead to the purposeful choice that it is in the national interest to develop space weapons. One path would follow from the judgment that space weapons are required to carry out the space control mission, which involves not only assuring full U.S. use of space but also denying that use to an enemy. It is not clear that there is a basis for such a judgment. As the head of the space control division on the Air Staff has suggested:

For the time being, this country can achieve space superiority without deploying weapons in space and without the use of weapons that create permanent effects on the commons of space. The United States should use space-based weapons only as a last resort but should not consider such use an unthinkable option. . . . Certainly, one would prefer to control the future through peaceful agreements that are in the mutual interests of the parties involved. At the same time, the United

States must prepare itself to deal with a wide spectrum of potential conflicts in space by developing and testing a number of military capabilities—up to and including space-based weapons, preferably those with temporary/reversible effects.[8]

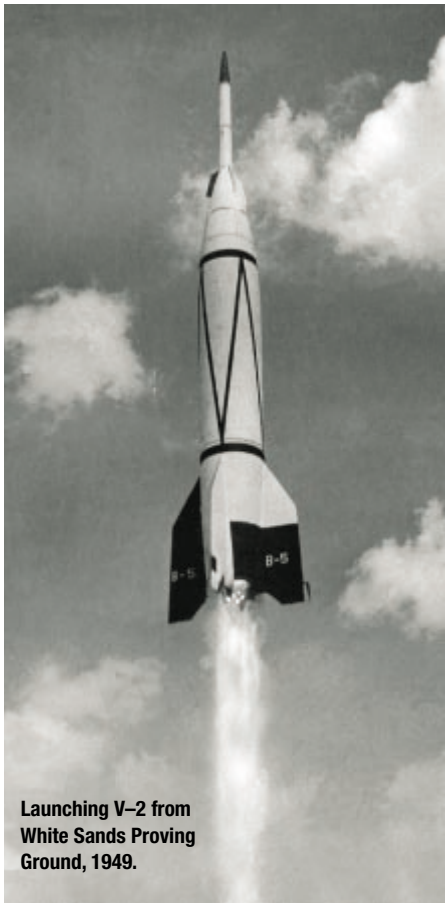
This perspective seems sound. If the Nation can control space for the foreseeable future without space weapons, it makes no sense to rapidly deploy them, given the implications of both domestic and international opposition to militarizing space.

Noting the military advantages that spacepower confers on the United States, it is highly likely if not certain that other countries will develop military space capabilities. At some point, the lives of military personnel may be put at risk by an enemy with space-based observation and navigation capabilities. Current policy calls for temporary and reversible means to deny that advantage in a conflict, and those means are being developed. Whether the ability to permanently neutralize or destroy satellites is also desirable is the kind of issue that requires continuing discussion.

A space Pearl Harbor—a surprise attack on important space assets—is the sort of concern the Space Commission addressed. The Nation must prepare for such an eventuality with the goal of deterring an attack and then responding appropriately if it should occur.

A second path to space weaponization follows from the conclusion that effective defense against ballistic missile attack on the United States or its allies requires some form of space-based boost phase intercept. The architecture being proposed by the Bush administration does not have space-based intercept capabilities. In the event of a decision that space basing of antimissile capability was preferable to ground basing, the space weaponization threshold would have been crossed. This is therefore another choice where the political and military dimensions should be debated.

if the Nation can control space without space weapons, it makes no sense to rapidly deploy them



Launching V–2 from White Sands Proving Ground, 1949.

Jet Propulsion Laboratory

For forty-five years the countries of the world have refrained in the main from developing capabilities for conflict in space. While the United States and the Soviet Union tested and deployed antisatellite weapons, a widespread perception arose that using outer space as an arena for warfare is undesirable. By contrast, some believe that space will inevitably become a battleground and that it is vital for the Nation to ensure dominance in that area. Those who hold this position have succeeded in creating an impression, at variance with current realities, that Washington is moving rapidly along a path that will lead inexorably to space weaponization.

The decisions that would lead to such a path have not been made. It is time for a real debate on pursuing such a course. The issues involve a range of political, economic, strategic, and military considerations. It is unlikely that a consensus will emerge, but policymaking on the U.S. approach to 21st century spacepower will be much better informed by airing these issues. **JFQ**

NOTES

[1] See John M. Logsdon, "Just Say Wait to Spacepower," *Issues in Science and Technology,* vol. 17, no. 3 (Spring 2001), p. 36.

[2] U.S. Space Command, *Vision for 2020,* 1996, p. 4, www.gsinstitute.org/resources/extras/vision_2020.pdf.

[3] Robert Smith, "The Challenge of Spacepower," *Aerospace Power Journal,* vol. 18, no. 1 (Spring 1999), pp. 32–39.

[4] Remarks by Teets are found at www.af.mil/news/speech/current/sph2002_21.html.

[5] Theresa Hitchens, " Weapons in Space: Silver Bullet or Russian Roulette?" a paper for The George Washington University Security Space Forum, p. 1, www.gwu.edu/~spi/spaceforum.

[6] Eric Javits, "A U.S. Perspective on Space" in James Clay Moltz, ed., "Future Security in Space: Commercial, Military, and Arms Control Trade-Offs," Occasional Paper no. 10 (Monterey: Center for Nonproliferation Studies, Monterey Institute of International Studies, July 2002), pp. 52–53.

[7] Barry Watts, *The Military Use of Space: A Diagnostic Assessment* (Washington: Center for Strategic and Budgetary Assessments, 2001), pp. 108–09.

[8] John E. Hyten, "A Sea of Peace or a Theater of War? Dealing with the Inevitable Conflict in Space," *Air & Space Power Journal,* vol. 16, no. 3 (Fall 2002), pp. 78–92.

Reviewing intelligence, Northern Edge '02.

U.S. Air Force (Adrian Cadiz)

Unity of Effort in Joint Information Operations

By SYNTHIA S. JONES, BERNARD FLOWERS, *and* KARLTON D. JOHNSON

Although information operations have long existed, it was only recently that joint doctrine began including such multidimensional operations in a systematic manner. In addition, the Nation has yet to conduct joint information operations (JIO) utilizing a full range of capabilities—public affairs, civil affairs, psychological operations, operations security, and deception.

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There is a legal dimension to information operations that is critical to their use. The United States has signed various bilateral and multilateral agreements that affect information operations. As Joint Pub 3-13, *Joint Information Operations*, states: "[information operations] may involve complex legal issues requiring careful review and national-level coordination . . . planners should understand the limitations that may be placed on [campaigns] across the range of military operations." Beyond such statements, however, there is little help for joint planners in maneuvering through the legal maze and even less training available to facilitate this information effort.

Today there is a perception that the joint community does not exercise this vital segment of the process. In fact, many engagements in which joint information operations have been used were only instances of piecemeal implementation. Current U.S. laws prohibit computer network attack and perception management or limit their use. Thus potent capabilities remain unexploited.

A comparison of the service doctrine with Joint Pub 3-13 reveals that each has considered information operations in terms of its doctrine. FM-100-6, *Army Information Operations*, assumes a land operations perspective—seeking information dominance by tactical advantage on the digital battlefield. Naval Doctrine Pub 6 views information operations in terms of command and control warfare for fleet operations. Even the Air Force, which adopts a more enlightened vision, has an air focus and uses doctrine to control the dimensions of air and space.

The Armed Forces view information operations in terms of the comfortable and the familiar, which is consistent with findings that service efforts fall short of an integrated joint approach.[1] One reason for this lack of integration is oulined in the concept known as *the politicization of strategy*.[2] According to this process, those charged with developing strategic ideas in the services are rarely objective; their job is promoting service interests. This phenomenon is evident in the development of both service and joint information doctrine. The politicization of doctrine means that the services are expert within their domains, and each conceives of doctrine in accordance with its worldview. One effect is that services apply the principles of their military doctrine to information operations. Such operations transcend the traditional boundaries of modern warfare.

services apply the principles of their military doctrine to information operations

The problems of effective joint information operations are compounded by the challenges of coordinating information-centric activities. U.S. Strategic Command is responsible for computer network operations because the preponderance of space-based and computer-centric systems reside within its scope. It also has responsibility for the Joint Information Operations Center at Lackland Air Force Base. However, it would not be appropriate to refer to Commander, Strategic Command, as the commander of information operations, which raises the issue of who is in charge.

Some believe that only combatant commanders could provide the vision, focus, and span of control necessary to protect national infrastructures from information aggression.[3] Moreover, it is argued that joint forces information warfare component commanders are needed to resolve planning problems and execute multifaceted information operations. However, an information operations command structure alone is not the answer. New threats and ubiquitous information technology have changed the limits of information operations. Although joint commanders will play a critical role in information campaigns, a single command does not have the resources, competencies, or partners to meet the enormity of the task. It could have the opposite effect. If one command is responsible for joint information operations, others may defer problems to that command rather than collaborating. Turf wars could erupt if funding becomes associated with particular commanders. In sum, a single command could marginalize the effort and diminish its importance in operational planning. Every combatant commander needs a role in the JIO process, but they are not the only critical players.

Fusing target data, Joint Expeditionary Forces Experiment '00.

U.S. Air Force (Lee E. Rogers)

Involvement on national, state, and local levels as well as in the private sector complicates matters. Attacks using information operations may not be limited to military targets. As identified in Presidential Decision Directive 63, the national infrastructure is a prime target. The attacks on 9/11 proved that the minds of the public are

subject to assault. Consider the crash of the first airliner into the World Trade Center. Few people saw the original impact or caught it on film. But many watched the second plane impact and send a clear message that it was an act of terrorism. The psychological effect was significant: the airline industry nearly went under, stocks plummeted, and Americans were traumatized. It is uncertain whether the Nation immediately realized the second attack was an information operation.

It is also unclear what countermeasures could have minimized the dreadful impact of 9/11. Evidence suggests that there should have been significant collaboration among public and private organizations, the military, media, et al. to deal with the consequences of an attack. But in practice, the Armed Forces have few capabilities available to combat asymmetric attacks on this scale. Both *Joint Vision 2020* and Joint Pub 3-61, *Public Affairs*, encourage commanders to use the media to shape the battlespace, but what relationships and procedures exist to achieve that objective?

if the Nation conducts information operations, the military would not be the only actor on the scene

From a joint perspective, leaders know that information operations are critical to the future. And while there has been an attempt to forge the necessary joint doctrine, something quite different had occurred. The doctrine drafters applied traditional ways of fighting to the JIO strategy. Based on the evidence, this has not been the most effective approach. Tried and true battle strategies will not win future wars fought in the continuum between the human mind and ephemeral cyberspace. Warfare has been transformed in moral, physical, and cybernetic terms. Moreover, technology has radically changed, decreasing the battle rhythm to a matter of seconds rather than days, thereby enabling a degree of influence unknown in the past. The so-called CNN effect reflects this change. Joint warriors must think differently about battlefields, doctrine, and actors.

A New Response

Cyber attacks against the United States by other nations are increasing at an alarming rate. Terrorist groups and foreign governments are using information operations in an effort to level the playing field. Some thirty countries have aggressive offensive information warfare programs, with America as a primary target. To survive such threats, the ways in which information operations are conceived and executed must change.

Representatives of combatant commands and services will come to the table with doctrine on information operations based on their individual worldviews. Effective change will only occur when service doctrine evolves beyond group think and disassociates information operations from service-specific control. Joint leadership must work together to overcome parochial barriers and guide the services towards a more authentic form of joint information operations. Joint Pub 3-13 is a good start, but it is conceptual and not directive in presenting the forms of a synchronized operation. But should joint doctrine provide direction down to service level? That could be a valid concern to the extent that the authority of the combatant commander is infringed. Nevertheless, there must be a better approach to leveraging service competencies. Commanders are the key and must guide their teams to break down service barriers to develop a more appropriate process for the times.

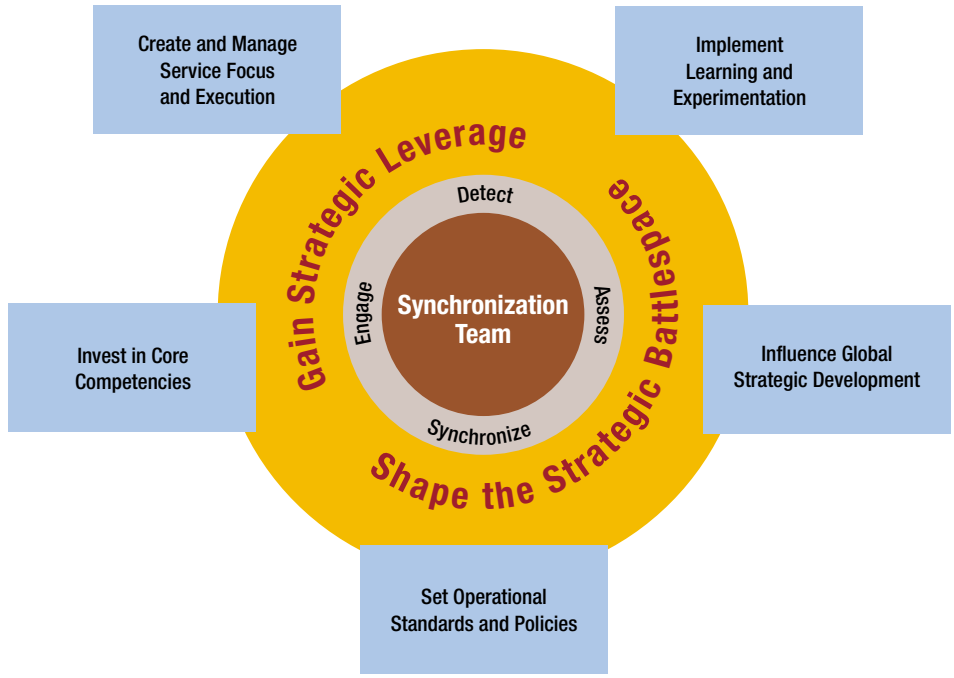
In parallel with the combatant commanders, the joint community should expand its efforts. If the Nation conducts information operations, the military would not be the only actor on the scene. The National Security Agency, Central Intelligence Agency, and other organizations would facilitate activities. Effective operations would also require partnering with the courts to ensure that actions taken are legal as well as capable of withstanding public scrutiny. Links with the media would be needed to provide accurate accounts of events to both domestic and international audiences. By leveraging such relationships, the joint team would be able to design cross-functional responses and thus have a role in influencing the entire operational landscape. These arrangements would provide a more realistic condition for jointness; they could enlarge the team to include stakeholders and employ the full range of natonal capabilities against the threat.

Unity of Effort

Joint information operations need unity of effort. Old models no longer work, and the joint community must reconsider the problem to obtain a workable solution. The information revolution requires an inclusive concept of the various elements of national information power. National security in the information age and the development and exercise of the information component of national strategy require a new paradigm of jointness that incorporates and synchronizes policies and activities in the information realm. Others have also advocated the need for harmonization.

A survey of extant theories and practice suggested the construct for what the authors have called the joint information operations synchronization team (see figure 1). This model also relies on a pioneering study that introduced the concepts of strategic intent, strategic architecture,

Figure 1. Synchronizing Joint Information Operations



and core competency.[4] In redefining strategic success, it emphasized that organizations must shape rather than respond to the future. In the case of information operations, that means fostering a revolution in expertise through the formation of the synchronization team. Appointed by the Secretary of Defense and headed by the Chairman, the team includes representatives of the military, intelligence community, industrial sector, media, et al. The team would accomplish various facets of this model. It would function between the operational and strategic levels to shape campaigns by acquiring and exploiting competitive advantages. Its role would include facilitating defensive information efforts for the joint community, such as detecting information operations, assessing their impact, synchronizing the joint response, and engaging other players. The strength of the team would rest on shaping the strategic information battlespace. While a joint information operations center would interface with the services, the team would develop gateways to other players.

Learning and Experimentation

Current joint doctrine does provide for government-wide exercises. However, key industry players are not included in the scenarios. Knowledge assets, procedures, and plans are not shared with industry or the media; yet the challenge to train as we fight is applicable. All players must be included in the deliberate and crisis action planning process (with consideration for the security of sensitive information) to properly synchronize efforts in the event of an attack. Exercises should be planned and executed jointly and their lessons shared. As teams form the necessary relationships, lines of communication will develop and the United States can shape the future. The knowledge gained will prove invaluable in identifying vulnerabilities across the board: technology, partnerships, competencies, and other factors. Forming these relationships will be the most daunting task.

Global Strategic Development

According to Sun Tzu, the apex of strategy is winning a fight without fighting. The experts have already highlighted cases where other nations are training and planning information operations against the United States. Reacting to the threat is a certain path to failure. Instead, the team must force an enemy into designated killboxes. The team is the focal point for synergizing this effort by shaping information operations,

PSYOP supporting multinational forces, Tradewinds '02.

U.S. Army (Joseph Bonet)

synchronizing community efforts by mapping a strategic architecture, and helping to build that future. A strategic architecture is defined as a "high-level blueprint for the deployment of new functionalities, the acquisition of new competencies (or migration of existing competencies), and the reconfiguring of the interface for those who receive the benefit of said competencies."[5] The joint information operations synchronization team would use this blueprint to influence other nations in the development of tactics, techniques, and procedures for information operations.

shaping the battlespace involves acquiring the right skills and technologies to field a sold information capability

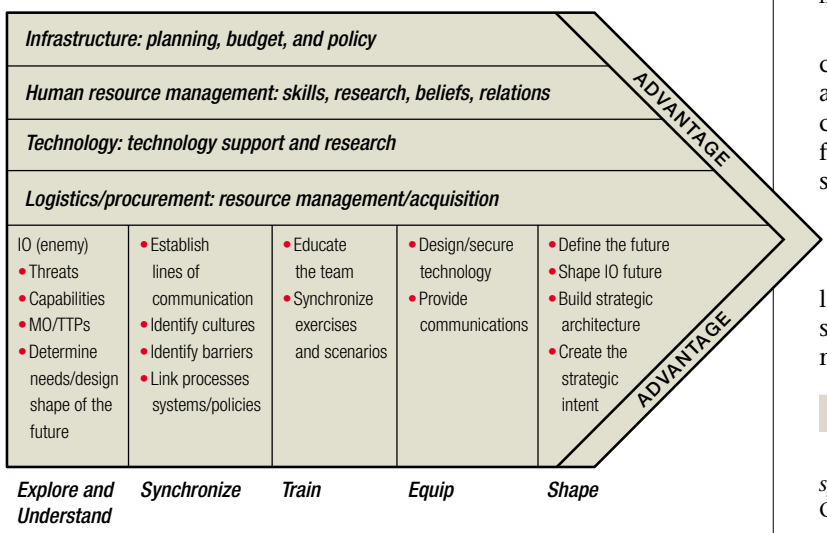
Since the United States is the world leader in technology infrastructure, it has leverage over how others use technology and information concepts. However, that lead is quickly diminishing. During the Persian Gulf War, for example, Iraq used information operations as an asymmetric tool to influence international opinion. America must set the pace and establish the standard. It must also rethink how national security strategy is developed. Chinese strategists have extensively used U.S. doctrine and guidance to formulate their conclusions.[6] The United States can use such documents to guide the rest of the world down its chosen road, simultaneously forging ahead on a different vector. Since perception management is a critical component of information operations, Americans should become experts in global perception management.

Core Competencies

Shaping the battlespace also involves acquiring both the right skills and technologies to field a solid information capability. The joint information operations synchronization team would be responsible for setting the strategic intent of information operations. This intent implies a particular point of view on the long-term environment in which an organization hopes to build a competitive position over time. Considering strategic architecture the brain and strategic intent the heart of the effort implies significant stretch for the team. The intent would then translate into a discussion among the team, learning institutions, and technology firms to determine what core competencies would be needed for the future. These parties would help develop those competencies, matching them to the strategic architecture previously discussed. The result would be a joint effort to secure the intellectual leadership, influence the strategic landscape of the battlespace, and preempt any advantages of use to potential enemies.

Effective joint information operations can be achieved through unity of effort that redefines views of jointness and rethinks the process for shaping the strategic battlespace. Each step in this

Figure 2. Joint Information Operations Value Chain



construct adds layers of improved value to the process, which take the joint information operations synchronization team to higher levels. Based on the work of various consultants and researchers, the JIO value chain can be constructed (see figure 2 above).[7]

The joint information operations synchronization team would affect infrastructure, human resource management, technology, and logistics. These must be harmonized to produce some value that facilitates the effective employment of joint information operations and gains a competitive advantage in this discipline. As the team works through the JIO construct, it will be mindful of the need to establish a competitive advantage and continually strive for enhanced value in every activity. The value chain serves as a visual queue that addresses how an action creates a greater advantage for the United States and whether that value exceeds the real or implied costs of producing it. This aspect of the construct is what separates it from other constructs for information operations.

There are myriad options for the United States with regard to joint information operations. Nonetheless, there are some evident truths:

- information operations will be both a strategic asset and a liability in coming years
- a competitive advantage will be achieved by shaping rather than reacting to the future
- jointness will be expanded to include a larger community of public and private interests working to define core competencies for conducting effective information operations campaigns.

Uniting joint information operations efforts could stimulate discussion so policymakers can attack the problem more effectively. Making complex issues understandable will provide a framework for the questions posed in this analysis. Additionally, taken to its logical conclusion, the construct presented above can address joint and interagency collaboration issues that remain among the most prevalent challenges to information operations. It is time to seek unity of effort in the arena of joint information operations. **JFQ**

NOTES

[1] Randall C. Lane, *Information Operations: A Joint Perspective* (Fort Leavenworth, Kans.: Army Command and General Staff College, 1998).

[2] Stephen M. Walt, "The Search for a Science of Strategy: A Review Essay," *International Security*, vol. 12, no. 1 (Summer 1987), pp. 140–60.

[3] Robert F. Gaines, "Future Information Operations in the Military: Is It Time for a CINC IO?" student paper (Maxwell Air Force Base, Ala.: Air Command and Staff College, April 2000).

[4] Gary Hamel and C.K. Prahalad, *Competing for the Future* (Boston: Harvard Business School Press, 1994).

[5] Ibid.

[6] Qiao Liang and Wang Xiangsui, *Unrestricted Warfare* (Beijing: PLA Literature and Arts Publishing House, 1999).

[7] Michael Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: The Free Press, 1985) and Michael Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York: The Free Press, 1980). The value chain model was actually developed by McKinsey and Company.

This article is an abridged version of an essay prepared by the authors while attending the Joint Forces Staff College.

Milosevic leaving dock at U.N. War Crimes Tribunal.

AP/Wide World Photo (ICTY TV)

Deterring Attack
The Role of Information Operations

By GREGORY L. SCHULTE

The overthrow of Slobodan Milosevic in October 2000 was a turning point in Balkan history. It set Serbia on a course to political and economic reform and also boosted international efforts to build peace in Bosnia and Kosovo. And it helped turn the Balkans away from nationalist violence and toward European integration.

Milosevic fell from power for many reasons. Chief among them were the unexpected unity of Yugoslavian opposition parties and the ridicule and civil disobedience inflicted on the regime by student activists. The United States, European governments, and nongovernmental organizations bolstered opposition forces while working to isolate the regime, undermine its legitimacy, and attack its power base. Even Milosevic contributed to his own demise by holding elections, which he could not successfully rig.

Before his downfall, Milosevic was president of the Federal Republic of Yugoslavia, which formally consisted of the republics of Serbia and Montenegro. However, his real authority was limited to Serbia less the province of Kosovo, which was administered by the United Nations after the intervention by NATO in 1999. The small republic of Montenegro was increasingly independent

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and played a principal role in undermining Milosevic's autocratic rule. As he came under more and more pressure, Washington policymakers became concerned that Serbia might launch a spoiling attack on Montenegro and use it as an excuse to call off elections and suppress the opposition. This would have been a major blow to Western hopes of bringing democracy to Yugoslavia and stability to the region.

Defeating a Serbian attack would have been difficult without a preemptive deployment of American or NATO ground forces to Montenegro. Political leaders in Washington and Europe were reluctant to commit ground forces, and chose to *deter* an attack rather than *defeat* one.

Information operations to influence Milosevic and his military advisors were a key part of the deterrent strategy. Those operations were broadly successful and reinforced previous lessons about the importance of starting early, clearly articulating objectives, coordinating domestically and internationally, and developing and monitoring measures of effectiveness.

in 1998, the Milosevic regime cracked down on the Albanian majority population in Kosovo

Ousting Milosevic

In 1998, the Milosevic regime cracked down on the Albanian majority population in Kosovo, a restive province of Serbia. While the crackdown was prompted in part by violent provocations by the Kosovo Liberation Army, Serb security forces employed the same heavy-handed tactics that had caused widespread death and suffering elsewhere in the Balkans. A quarter million ethnic Albanians fled to the mountains by September and faced death from starvation and exposure. Only American diplomacy backed by a threat of NATO airpower convinced Milosevic to withdraw his forces and allow the Albanians to return to their villages.

The United States had previously tolerated Milosevic's presence despite his reputation as the butcher of the Balkans after the conflict in Bosnia. His campaign of violence in Kosovo and the associated risks to regional stability now convinced Washington to begin creating the conditions for a change in regime. Washington adopted a new strategy which sought to strengthen democratic forces by providing resources and advice to the political opposition, student movement, and independent media. The strategy also sought to undermine the three pillars of Milosevic's power base—the security services, a network of cronies, and control of the media—with targeted sanctions and other means to encourage dissent.

Renewed attacks by Serbia on Kosovo Albanians in early 1999 made American policymakers more determined to unseat Milosevic. Belgrade's continued use of violence, combined with its rejection of a political settlement at Rambouillet, led NATO to carry out its threat of air strikes starting in March. These attacks, Operation Allied Force, were initially foreseen as lasting days or perhaps weeks. Milosevic's intransigence meant they continued for nearly three months.

Allied Force did not aim explicitly to oust Milosevic, but the Alliance did seek to weaken his political control. In the midst of air strikes, President Bill Clinton called for a democratic transition, saying that "the region's democracies would never be safe with a belligerent tyrant in their midst." At the Washington summit in April 1999, held to commemorate the 50th anniversary of NATO, Allied leaders joined the call for democratic change.

The air strikes included regime-related targets such as leadership, security forces, and military-related factories owned by Milosevic cronies. Some of the latter were hit after the cronies had been warned about their support for the regime. A precision attack on Milosevic's residence, leaving a hole in his bedroom wall, was perhaps the most pointed. The Joint Warfare Analysis Center helped design this effects-based targeting.

Allied Force was complemented by diplomatic efforts, economic sanctions, and information operations designed to isolate Milosevic and undermine his support. The United States helped establish broadcasting facilities in neighboring countries. The so-called "Ring around Serbia," augmented by broadcasts from Commando Solo aircraft, allowed the Serbian public to hear independent media which Milosevic had tried to suppress. In one incident, Yugoslav army draftees deserted when they heard from the Voice of America that state riot police were violently suppressing peaceful protestors in their home towns.

In June 1999, after 78 days of air strikes, Milosevic conceded to NATO demands. The reason for his decision remains a matter of debate, though political survival surely weighed in his calculations. But after the atrocities in Kosovo and his indictment for war crimes, Allied governments could not countenance his rule. Bringing peace and stability to the region could not succeed with Milosevic in power.

Working with its allies in Europe, Washington stepped up its efforts to undermine the regime. The targeted sanctions remained in force, and Belgrade was kept isolated internationally. At a meeting in Sarajevo to inaugurate the Stability Pact for Southeast Europe, U.S. and European leaders used the occasion to underscore Yugoslavia's isolation under Milosevic as well as the place reserved in Europe for a democratic Yugoslavia without him.

AP/Wide World Photo (Lefteris Pitarakis)

Demonstrating against Milosevic in Montenegro.

Despite his public defiance, Milosevic was feeling the political pressure. In July 2000, Milosevic called for elections to be held within two months in an ill-calculated attempt to bolster his legitimacy at home and abroad. That was a fatal mistake that allowed Washington to shift from a strategy aimed at discrediting his rule to one that sought to depose him from power.

With international encouragement and assistance, the opposition coalition threw its full support behind Vojislav Kostunica, the strongest challenger to Milosevic. In the elections held on September 24, the opposition parties, local and international electoral observers, and the U.N. Mission in Kosovo acted in concert to uncover and defeat the regime's efforts at electoral fraud. Finally, after Milosevic refused to accept Kostunica's success at the polls, Serb security forces ignored their orders to move against the crowds of citizens mobilized by the opposition.

After meeting with the Russian foreign minister on October 6, 2000, Milosevic went on Serbian television and acknowledged defeat. Eight months later, he was arrested and flown to The Hague to stand trial for war crimes.

Montenegro

From late 1998 until Milosevic was ousted in October 2000, Montenegro played a pivotal role in the strategy to remove him. America sought to bolster the president of Montenegro, Milo Djukanovic, as a counterweight to Milosevic and to use that country as a springboard for a variety of democratization efforts.

While Serbia remained under international sanctions, Montenegro benefitted from U.S. aid and advice. It soon received bilateral assistance rivalling that of any other country on a per capita basis. Encouraged by Washington, Montenegro became increasingly independent of Belgrade, issuing its own currency, building its own institutions, and providing a haven for political opponents and independent media suppressed by Milosevic.

With help from the West, Djukanovic became a direct threat to the legitimacy of Milosevic, both at home and abroad. Milosevic was banished from international events and reduced to contacts with rogue and obscure states. That was a shock to a national leader who had signed the Dayton Accords and regularly hosted heads of state and their envoys. Meanwhile, Djukanovic enjoyed widespread attention. At the invitation of the President of the United States, he went to New York for the Millennium Summit. Indicted by the War Crimes Tribunal, Milosevic stayed home.

Though not sanctioned by Washington, periodic calls by Djukanovic for a referendum on independence also posed a threat to Milosevic. The president portrayed himself as the only person capable of keeping the remnants of Yugoslavia together, but the defiance of Montenegro suggested otherwise.

Milosevic sought to neutralize this threat from Montenegro. During the NATO air campaign in 1999, allied officials worried that Milosevic would use the conflict as cover for an attack on Montenegro. To forestall such an exigency, the Alliance reaffirmed strong support

for the Djukanovic government and warned Belgrade that any attempt to undermine it would have grave consequences. That threat probably had an impact in the midst of an extended campaign, but its credibility receded when air strikes ended in June.

There were clear indications by 2000 that Milosevic was laying the groundwork for an assault on Montenegro. He was good, although not always successful, at operating just below the threshold that would elicit a strong international response. Milosevic probably assumed that an all-out attack would lead to an Allied response, particularly after the bombardment in 1999. But he may have thought that a coup de main, relying on the thugs of 7th Military Police Battalion in Montenegro, would only elicit a flurry of diplomatic activity.

there were clear indications by 2000 that Milosevic was laying the groundwork for an assault on Montenegro

Deterring Attack

Washington recognized that decapitation of the government of Montenegro would dramatically set back peace efforts in the Balkans. And it would mean a major defeat for NATO. Thus various steps were taken to protect the Djukanovic government, and options were developed for diplomatic, economic, and military responses. Defeating an attack was determined to be problematic without a deployment of either U.S. or NATO forces to Montenegro. That option was not favored by Washington, let alone in Europe.

As a result, U.S. policymakers recognized that effective deterrence was the key. Their strategy was intended to dissuade Milosevic from attacking Montenegro, weaken his legitimacy and power in Serbia, and maintain international isolation and sanctions on Belgrade. Policymakers agreed that the desired endstate was preserving the Djukanovic government as a platform for democracy and undermining and ultimately removing Milosevic from the scene.

The U.S. strategy, which was interagency in nature and in execution, included:

- diplomatic and economic support to the Djukanovic government coupled with private warnings to avoid actions that could provoke an attack
- approaches to Moscow encouraging the Russians to both warn Milosevic and use their influence with the Yugoslav military and Serb security services
- information operations designed to keep Milosevic and the Yugoslav military uncertain about the Western response to an attack
- close consultations with NATO and European allies to promote a common approach.

The Pentagon took the lead in conducting information operations. In the case of Montenegro, these operations focused on influencing the perceptions of the leadership in Belgrade and were part of a larger information campaign overseen by the Department of State.

Information operations used deployments and exercises conducted in the region to demonstrate U.S and NATO capabilities and keep Milosevic and the Yugoslav military uncertain about Allied responses to an attack on Montenegro. The concept was simple: to make Milosevic and his advisors understand that their planning and preparations were being carefully monitored and that an attack, even with minimal warning or force, would elicit a strong response. The intent was to leave Belgrade uncertain about the nature of the response but fearful that one was inevitable, even if the United States and United Kingdom had to act on their own.

Information operations took advantage of U.S. military activities in the region. These included port visits, the deployment of a Marine

AP/Wide World Photo (Lefteris Pitarakis)

Montenegrin police training in May 1999.

Expeditionary Unit, and an amphibious exercise. They also took advantage of NATO exercises such as Dynamic Response 2000 in Kosovo and deploying the strategic reserve for Stabilization Force (SFOR) and Kosovo Force (KFOR) in March and April.

Detailed planning took place in cells both on the Joint Staff and at U.S. European Command. An interagency core group on information operations in Washington, which was initially established for the Kosovo campaign, provided weekly guidance and deconflicted other aspects of the campaign. It also monitored intelligence on actions by Belgrade and sought to judge the effectiveness of various themes and methods of delivery.

The United Kingdom was integrated into planning and operations at an early stage and made major contributions. British officers were fully involved, often by participating over secure video with the planning cell at U.S. European Command and the core group in Washington. The deployment of a British carrier to the Mediterranean in September had a particularly significant informational impact in Belgrade.

Achieving Success

Milosevic never launched an attack on Montenegro, and the desired endstate was achieved. A good information operator would claim that the deterrence strategy, backed by information operations, had succeeded. But it is also possible that, as some believed, an attack was never likely in the first place.

Uncertainty aside, there were multiple indications that information operations did help alter the perceptions of the intended audiences. The exercises and deployments were noticed in Belgrade, and the Yugoslav military became convinced that NATO would respond to an attack on Montenegro. Milosevic was well aware of the differences in Brussels that might keep the Alliance from acting but was nonetheless concerned about

a military response by the United States and United Kingdom.

The concerns of the regime were reflected in an article published by the state-run press in September 2000. It warned that the United States and its NATO partners "have feverishly sought and still seek a pretext . . . to justify a new military intervention" and cited four exercises in the region. It also cited a statement by the commander of NATO air forces in Europe that the Alliance was looking at a full range of options should Milosevic move against Montenegro.

Information operations were also successfully integrated into a larger information campaign. That thrust, led by the Department of State, was aimed at influencing foreign audiences both inside and outside Yugoslavia. It targeted Milosevic and the September elections in addition to Montenegro. Broad themes and daily messages were distributed interagency and shared with allies at NATO headquarters, where the public warnings of the Secretary General, Lord George Robertson, played an important deterrent role.

information operations were also successfully integrated into a larger information campaign

The information campaign was successfully coordinated with diplomatic efforts. When President Clinton met with President Putin in early September, Montenegro was at the top of the agenda—and their meeting was used to signal American seriousness and international support. U.S. diplomats helped arrange for Djukanovic to meet with the British prime minister, French president, and German foreign minister in a show of support. The Secretary of State publicly warned Milosevic to "keep his hands off Montenegro" while refusing to discuss the motives for an exercise by the Marine Corps in Croatia.

Areas for Improvement

Despite an early decision to initiate planning, information operations did not start in earnest until the middle of August 2000 and then only after a push by the White House. The late start reduced the chance to shape the thinking of key audiences. It meant that some activities supporting information operations, such as the Marine Corps exercise, ran up against the September elections in Yugoslavia. As a result, Milosevic was able to cite these events in his campaign rhetoric, claiming that the Allies were using military force to threaten Serbian voters. An earlier start could have avoided these problems.

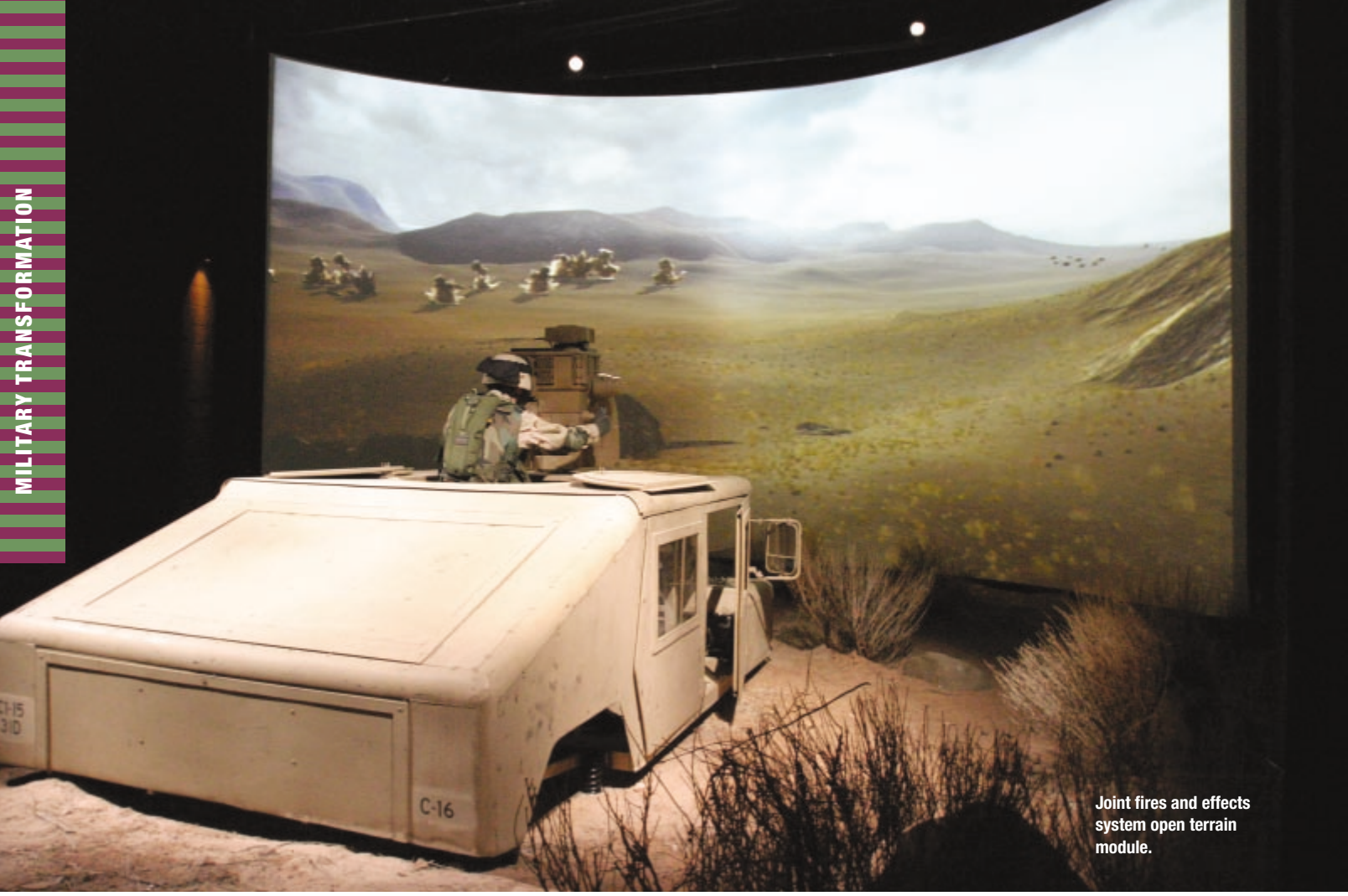
Once the operations began, their execution was complicated by the mix of players and their disparate views of the meaning, utility, and relevance of information operations. Public affairs officers were wary that information operations aimed at influencing foreign leaders could inadvertently mislead both the media and public at home. This risk of blowback was minimized by the exclusive use of truthful information. Even then, it took some effort to shift the guidance on public affairs from a passive to an active footing to ensure that the military activities, rather than being downplayed as routine, received added attention across the region.

Integrating NATO allies, with the exception of the United Kingdom, was also difficult, reducing the overall coherence of the operations. There were many reasons for allied reluctance to participate in the information operations, including their underestimation of the threat, the lack of NATO doctrine and organization, and the aversion on the part of many diplomats to military action that smacked of propaganda. Similar factors had stymied NATO information operations during the air campaign in the previous year.

Finally, measures of effectiveness were not established or monitored on a regular basis. As a result, there was never a satisfactory mechanism to evaluate performance or help determine when messages or their conduits required adjustment. Policymakers found themselves relying on occasional intelligence or press reports to get a sense of whether the information operations were having any impact.

Information operations in Montenegro reinforced the lessons from Kosovo. Such operations must be based on a clear articulation of objectives and strategy. Interagency and international coordination are essential. Information operations should be integrated from the outset into contingency planning and must start as early as possible to have maximum effect. For each operation, a single agency should be responsible for developing and monitoring measures of effectiveness that employ a broad range of indicators, from sensitive intelligence to public polling.

Done right, it is clear that concerted efforts on the operational level to influence enemy perceptions can have strategic impact, protecting U.S. interests and reinforcing or obviating the use of force. This was the case in Montenegro, where U.S.-led information operations helped to deter attack and created conditions for democratic change and a more stable region. **JFQ**



Joint fires and effects system open terrain module.

U.S. Army (Fred W. Baker III)

Joint Doctrine—Engine of Change?

By STEPHEN J. CIMBALA *and* JAMES J. TRITTEN

A considerable effort is being made to foster military transformation, much of which is related to the revolution in military affairs (RMA) and its implications for defense policy and strategy. How the military thinks, learns from experience, and trains presents major challenges to transformation. Such concerns are the stuff of doctrine. Yet doctrine and its relation to change receive less attention than other aspects of transformation.

Some leaders have acknowledged the role of doctrine. As the Chairman told Congress, "transformation must include training and education, doctrine, and organizational changes."[1] Vice Admiral Arthur Cebrowski, USN (Ret.), director of the Office of Force Transformation, indicated that the process will result in changes in leadership, decisionmaking, experimentation, organizations, matériel, readiness reporting, planning (which often will

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not precisely fit existing doctrine), doctrine itself, and training.[2]

Doctrine is vital to developing concepts of war, education, training, organization, and warfighting. The development of AirLand Battle in the Army provides a case study of doctrine as an engine of change. Moreover, doctrine is more than the sum of its parts. It lives and breathes into future plans and battles, beyond the visions of those who developed and produced it. Success in doctrine is about victory in future war.

Doctrine and Change

Despite its importance, the relation of doctrine to change remains controversial among military officers and defense analysts alike. There are reasons, based on American culture and military tradition, for skepticism about the impact of doctrine on military thinking, organization, training, and fighting. First, doctrine is often promulgated in a one-size-fits-all framework that belies the experience of operational and tactical commanders. Second, it has a natural tendency toward abstraction and generalization that frustrates attempts to draw particular conclusions. Third, once put into play it takes on an inertia that can defy changes in the geopolitical, technological, and social environments of war. Finally, each service has its own unique doctrine; thus joint doctrine must be negotiated across the sovereign boundaries of service ways and means of organizing, thinking, and fighting.

Acquiring satellite signal, Blue Flag '02-4.

2d Communications Squadron (Michael A. Kaplan)

transformation occurs when the military masters new methods of warfare

Despite the obstacles to developing doctrine that can promote change, it is already used in that way. If we intend to transform the Armed Forces, the real issue for joint doctrine is to establish its role in the process. Transformation occurs when the military masters new methods of warfare and can exploit an advantage on the field. Broad transformations are driven by major changes in technology, culture, society, and other aspects of the environment pertinent to preparing for and waging wars. Evidence that joint doctrine is playing a part in transformation implies that personnel will at least have been educated/trained in some new joint doctrine and/or joint tactics, techniques, and procedures (JTTP) and perhaps have some new equipment.

Joint Vision 2020 uses the term *doctrine* eleven times in phrases such as "development of doctrine, organizations, training and education, leaders, and people that effectively take advantage of the technology" and "a vision for integrating doctrine, tactics, training, supporting activities, and technology into new operational capabilities."

The Joint Vision Implementation Master Plan explains how to achieve the goals outlined in the vision statement. It states that changes in joint doctrine will be recommended but does not indicate how or detail its role in transformation.

There is a role for doctrine in exploiting RMA breakthroughs. What good are innovations in technology when the military is not trained to use them to their fullest advantage? What good is training with new weapons when there is no doctrine on how to fight with them? Americans assume that technological innovation automatically confers military superiority. But history has recorded the defeat of numerous militaries holding that belief. Technology must be exploited for battlefield effect in a faster decision cycle than a potential enemy. Preparing for the optimal use of technology requires clear organization, planning, and training to impact all aspects of doctrine.

One analysis of the transformation of the German army during World War I highlights the necessity of taking the new idea through its logical end-state of implementation in the field:

> *The initial theory developed by* [Oberst] *Bauer and* [Hauptman] *Geyer was beyond the capabilities of the German army to put into practice. It demanded commanders at every level to direct their forces with minimal guidance from above and required troops to perform complex manoeuvres on their own initiative while under heavy fire. The skepticism of many officers was not unfounded. It was only through a major programme of training, in which everyone from private to general was taught how to fulfill their own part in the doctrine, that the Germans were able to bring that doctrine into effective reality.*[3]

The Army has invoked the term *engine of change* in referring to the role of doctrine in transformation. In a pamphlet issued by U.S. Army Training and Doctrine Command in 1994, *Force XXI Operations*, doctrine is identified as an engine of change, implying that it influences training, equipment, and organization and serves as a conceptual basis for growth. It also states that the Army would use doctrine to shape the ongoing RMA with a visionary statement on the future battlespace. Its more recent plans for transformation suggest that doctrine is regarded as the voice rather than the engine of change, but include a comprehensive part for doctrine in driving modifications in training.

Many identify AirLand Battle as the quintessential example of doctrine driving change. When the Army decided to revolutionize the way it fought, it used new concepts and doctrine to engineer a thorough overhaul

Marines supporting Task Force 51.8.

U.S. Navy (Joseph Krypel)

of methods and equipment. The service published a new edition of Field Manual 100-5, *Operations*, in 1982 to be the catalyst for matériel requirements, changes in education and training, reorganization, and leader development.

While joint doctrine is not the means of transformation, a review of its influence reveals that it plays a role that should not be overlooked. It can best support transformation through concept development, programming, and joint tactics, techniques, and procedures (JTTP); both service and multiservice doctrine and tactics, techniques, and procedures (TTP); and education and training.

Although the two terms are often used interchangeably, doctrine and concepts do not have the same meaning. According to Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, doctrine means the "fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives." It is a codification of professional norms and practice. On the other hand, a tactical concept is "a statement, in broad outline, which provides a common basis for future development of tactical doctrine." Thus concepts are future doctrine—ideas that might become doctrine when validated and supported. Joint concept development focuses on activities associated with operational art.

The Causal Matrix

Before it can be improved, doctrine must be understood as a baseline from which those who develop new concepts depart. Such ideas may be conceived in the form of concept papers, experimental doctrine, draft doctrine, or other think pieces. Lest concept developers work in isolation on their ideas, doctrine experts must ensure that concept developers are kept informed of other recommendations to improve doctrine in the same area.

Recommendations to improve doctrine come from many sources, but ultimately those with new ideas need to interact with the keepers of the flame. Doctrine organizations are likely to have a wider knowledge of suggested improvements than a single concept developer.

The development process succeeds when concepts are validated and recommended for incorporation in doctrine. The final step takes place when a concept is accepted by warfighters in the field and fleet. In the case of the AirLand Battle, while it was conceived at Headquarters, U.S. Training and Doctrine Command, at

Fort Monroe, the new version of FM 100-5 actually emerged from Fort Leavenworth. Regardless of who prepares the change, there are necessary staffing actions. The current process of some twenty-one months is about right to introduce a new idea that has not been validated but probably is too long for a concept that has been vetted.

Hypothetical concepts that have undergone lengthy examination and experimentation, then further analysis and approval by the Joint Requirements Oversight Council, serve as an example. If such concepts are endorsed by unified commands, services, and Joint Staff, what would be the purpose of considering them at action officer level through the existing joint doctrine process? The procedure should be replaced by an accelerated track of a few months rather than the twelve-and-a-half month fast-track schedule. Nothing precludes the introduction of changes to doctrine based on analysis prior to a formal council decision. That would be fitting when concepts do not depend on the procurement of new matériel.

When appropriate, joint and service doctrine under accelerated or fast-track change can support the procurement of matériel for transformation. In the case of AirLand Battle, concepts that were codified as doctrine became instrumental in changing tank, infantry fighting vehicle, and helicopter design. A conscious decision was made to modify existing programs instead of canceling or starting new initiatives, which saved time.

new concepts are generally developed as part of the acquisition of new hardware

New concepts are generally developed in conjunction with the acquisition of new hardware and other assets, but existing doctrine may be sufficient and a partner in transformation rather than an obstacle to overcome. Most important, new hardware must often be accompanied by new doctrine to explain how it will be used and as the basis for training.

What Doctrine Affects

- Policy and Strategy
- Organization
- Programming and Force Structure
- Planning
- Concepts Education and Training/Exercises
- Local Tactical Directives and Rules of Engagement
- Tactics, Techniques, and Procedures
- Other Doctrine

What Affects Doctrine

- Existing Doctrine
- Threat
- Geography/Demographics
- Technology
  - Resources
  - Strategy/Military Culture
- Other
  - Policy
  - Concepts
  - Tactics, Techniques, and Procedures
  - Strategy and Campaign Concepts
  - Change of Government
  - History/Lessons Learned

Toward Doctrinal Consistency

As a transformational concept is developed, it could become joint doctrine. To expedite this process, concept advocates may want to disseminate the doctrine across the Armed Forces, which will take time. Whenever new doctrine is issued, parallel changes must be made in other publications at the same time. For example, a major change in Joint Publication 3-0, *Joint Operations*, can affect many other titles. Moreover, service doctrine must be consistent with joint doctrine; hence a new concept in joint doctrine can impact on service doctrine as well as both service and multiservice tactics, techniques, and procedures. This cascading effect occurred when the Army developed AirLand Battle in FM 100-5. Subordinate branch and functional publications such as FM 71-2 (for battalions) and FM 71-100 (for brigades and divisions) had to be revised to reflect new operational-level concepts.

JTTP are defined as "actions and methods which implement joint doctrine and describe how forces will be employed in joint operations. They will be promulgated by the Chairman . . . in coordination with the combatant commands, services, and Joint Staff."

Joint doctrine determines joint tactics, techniques, and procedures and also the approach of the Armed Forces to joint warfare. Thus if transformation is intended to enhance jointness, doctrine and subordinate tactics, techniques, and procedures must change. Such change will be easier to accomplish if joint doctrine is written and promulgated in an electronic form. While unwritten doctrine exists and is equally valid, its consistent implementation is difficult at best. The record of the Air Land Sea Application Center suggests that consistency among individual service tactics, techniques, and procedures can be achieved.

There is power to be derived from addressing doctrinal consistency, especially when the effort is intended to enhance warfighting capabilities, an implied goal of military transformation. Joint doctrine and JTTP should first be made internally consistent. The importance of constancy is best demonstrated by the NATO definition of commonality: "The state achieved when the same doctrine, procedures, or equipment are used."

The Joint Staff, joint publication primary review authorities, and Joint Warfighting Center at U.S. Joint Forces Command are tasked to impose consistency, and new management tools

Brigade subscriber node integrated management system.

Fort Gordon (Claude Stallings)

such as the joint doctrine electronic information system will help provide that support. With the shift to paperless doctrine, revising joint pubs will be timely and changes in other sources could quickly follow. The services will complete the codification of existing unwritten doctrine to facilitate what needs to change as transformation takes place.

Training and Doctrine

It is no coincidence that U.S. Army Training and Doctrine Command has responsibility for education and training as well as doctrine. When a new joint concept is adopted, it must be translated into doctrine. In turn, that doctrine must be incorporated in educational curricula and training programs—learning is necessary for transformation to reach its full potential. Doctrine is a prime means for members of one service to learn about the capabilities of other services.

Joint Publication 1, *Joint Warfare of the Armed Forces of the United States,* envisions joint culture as a common goal. Changing military culture is a lengthy task that requires constant reinforcement. When the Army used AirLand Battle as an engine of change, it consciously sought to challenge the average soldier stationed in Europe, who at that time believed that he could not win despite his best efforts.

Efforts such as accreditation of joint education, self-certification of joint courses, and joint lessons learned are critical in monitoring transformational doctrine and enhancing joint culture. Although not fully realized, joint culture is an acceptable goal for the Armed Forces. Joint Pub 1 envisions a "common joint culture from which to integrate service cultures and doctrines." Indeed, any attempt to attain such a vision to integrate joint culture and doctrine is itself transformational.

Doctrine is also the basis for joint exercises and operations. Exercises in peacetime and, to a certain extent, actual operations can be monitored to establish the relationship between the doctrine employed in exercises and practice. The lessons learned process could determine how far extant doctrine is exercised or followed. When a concept is introduced and then becomes part of joint doctrine, it will take time for the old habits to die. Eventually differences between what should have been and what was observed should be diminished.

Exercises and terrain walks, in the case of AirLand Battle, played a key role in retraining senior officers in new doctrine that did not match what they were exposed to earlier. Any plan to transform the Armed Forces should incorporate these approaches or their equivalent and a vigorous lessons learned program to ensure feedback on how well the force actually follows new doctrine. Helmuth von Moltke (the elder) and Alfred von Schlieffen emphasized staff rides and walks over terrain as important means to test German doctrine for ground truth.

The observed results of training, exercises, and operations can serve as the baseline for future programs to improve the force. When those results reflect doctrinally approved actions, recommended changes in matériel, doctrine, or both can be compared against current force capability. A sound lessons learned process that correlates lessons to existing joint doctrine can help justify the need for transformation.

Doctrine education includes building support for new ways of doing business. In the case of the AirLand Battle, a dedicated marketing program was developed to ensure that Congress, the Army, and the Air Force were persuaded that they were moving in the right direction. The importance of this task cannot be overestimated.

Education also provides the Armed Forces with an opportunity to reach members of the public, who increasingly lack any military experience. Doctrine awareness programs such as the doctrine networked education and training modules and the joint force employment wargame, which are available via the Internet or on CD–ROM, will need to be updated to reflect the new doctrine associated with transformation.

Joint publications can explain military culture to civilians in an understandable language. If doctrine is authentic, explicit, and comprehensive, it will enable the public to be better informed about military affairs. The strength, roles, and employment of the Armed Forces are decided by voters through their elected representatives, and not by military professionals. On

the other hand, to enable this level of awareness to exist, the military must explain itself with clarity and avoid the use of neologisms and jargon.

Organization

A reciprocal relationship exists between doctrine and organization. The course of revising doctrine must find its way into plans, programs, and policy by means of organizational adoption (someone must own it) and direction (someone must drive it). But if doctrinal rethinking implies substantial change in organizational behavior, one or more elements may resist. Organizations inherently oppose change that threatens to diminish their autonomy. The persistence of the horse cavalry well into the 20th century is exemplary. Joint doctrine has the burden, from the perspective of the services as organizations, of making the case for cooperation based on convergent missions and objectives, despite diverse organizational interests and constraints.

the course of revising doctrine must find its way into plans, programs, and policy

One innovation was the adoption of the joint force air component commander (JFACC) concept. Prior to passage of the Goldwater-Nichols Act, U.S. Air Forces Europe had developed TTP that included JFACC for use within theater. A similar idea was proposed for NATO. U.S. European Command placed the concept in a local theater counterair publication and became lead agent for JCS Publication 26. The Joint Staff later designated this document as Joint Publication 3-01.2, *Offensive Counterair*.

JFACC was then used by U.S. Atlantic and Central Commands in operational plans and exercises and U.S. European and Central Commands in actual operations, particularly Desert Shield/Desert Storm. JFACC became a regular feature of joint organization as other areas of joint doctrine were affected. Service programs were adjusted to support this expectation: the Army battlefield coordination element was expanded to be a battlefield coordination detachment to better support joint force commanders and JFACCs. The Navy built the concept into the contingency theater automated planning system.

A Joint Process?

Implied in analyzing the role doctrine can play in transformation and as an engine of change is the recognition of a joint doctrine process that includes more than publishing manuals. At a minimum, the process takes into account all possible influences on joint doctrine, the existing publication process, and other matters that doctrine can or should influence.

The process described above is not without limits. The best doctrine cannot compensate for flawed policy, poorly defined objectives, or operational/tactical approaches that are one step behind those of an enemy. Doctrine can help to prepare for deterrent and defense missions. But hollow doctrine that fills glossy publications but is not realized in the field and fleet is worse than useless: it conveys an image of preparedness that is as misleading as it is superfluous. Finally, true believers must drive doctrinal innovation as an element of military transformation, often in the face of considerable adversity. There is no road to salvation without dedicated apostles.

Joint doctrine can be an engine of change. Improving doctrine is a necessary condition, albeit an insufficient one, for military transformation. It can support the development of new ideas and advance validated concepts through doctrinal publications. Moreover, it can expedite future transformation. Improving doctrine helps programming and fielding of new hardware. This role can be reactive or proactive. As the Secretary of Defense has pointed out, "All the high-tech weapons in the world will not transform the U.S. Armed Forces unless we also transform the way we think, the way we train, the way we exercise, and the way we fight."

As new concepts emerge, both joint doctrine and joint tactics, techniques, and procedures will evolve to reflect the American way of war. Existing processes and programmed information management tools will facilitate this role for joint doctrine. Finally, new doctrine will be the basis for changes in education, training, and exercises to develop professionals who will lead the Armed Forces into action. Without inserting new doctrine into schoolhouses, exercises, and the actual conduct of operations, it will become an unfulfilled vision of how to operate—a book on the shelf. Flawed doctrine is more than irrelevant. History records many highfalutin doctrinal expressions that paved the way for military failures. **JFQ**

NOTES

[1] Chairman of the Joint Chiefs of Staff, Fiscal 2003 Department of Defense Budget Testimony (transcript), as delivered, before the House Armed Services Committee, February 6, 2002, http://www.defenselink.mil/speeches/2002/s20020206-secdef.html.

[2] Arthur K. Cebrowski, *Special Briefing on Force Transformation*, November 27, 2001, http://www.defenselink.mil/news/Nov2001/tll272001_t1127ceb.html. Speaking at a conference on defense excellence sponsored by the American Institute of Aeronautics and Astronautics on February 19, 2002, in Washington, Cebrowski apparently also made an off-hand remark that "doctrine, as we know it, is probably dead, along with the process which creates it." See David McGlinchey, "Officials Say Afghanistan Ops Showed U.S. Can Adapt In New Situations," *Inside the Army*, February 25, 2002, p. 2.

[3] Martin Samuels, *Command or Control: Command, Training and Tactics in the British and German Armies, 1888–1918* (London: Frank Cass, 1995), pp. 196–97.

Landing Swedish marines.

U.S. Navy (George Sisting)

Transforming Joint Exercises and Readiness

By STEPHEN J. MARIANO

In recent years *transformation* has largely replaced the term *revolution* to describe change in military affairs. Although assertions about doctrine, organization, and technology that fueled the debate over the revolution in military affairs have been moderated, they remain fundamental to understanding the nature of war. Moreover, the initial focus on the military-technological aspects of revolutionary change has expanded to include doctrinal and organizational change.

The military has embraced transformation and begun to examine future ways of training, organizing, and equipping forces to deliver transformed capabilities to commanders in the field. Some innovation is driven by technology, but its implementation largely results from the struggle to

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modernize. While technology influences military developments and the services manage their assets, combatant commanders must employ the forces provided to them and integrate doctrine, organization, and technology to accomplish complex missions. Fighting and winning wars is the priority of unified commands, but training and readiness are primary peacetime objectives.

U.S. European Command (EUCOM) reviewed training, exercise, and readiness within its region and found that transformation depends on well-aligned military objectives, structures, and forces as well as good relations with allies. Although the review focused on operating and personnel tempo rather than technological or doctrinal change, it fit squarely into the broader framework of the transformation project.

When EUCOM began examining its training and exercise program before 9/11 because of a concern over waning readiness, several major points emerged:

- training and exercises must be transformed from a schedule based on legacy events; rather they must be based on contemporary joint and combined warfighting requirements
- NATO exercises are important indicators of Alliance cohesion as well as substantial joint and combined training venues but are often based on antiquated requirements
- Partnership for Peace (PFP) exercises are vital security cooperation events but often fail to provide quality coalition interoperability training
- increased collaboration with NATO force and exercise planners is essential to improving the exercise program for U.S. forces.

Exercise planners on the strategic, operational, and tactical levels are working to replace the legacy of the Cold War, including so-called campfire exercises.

UH–60s transporting multinational force.

30th Communications Squadron (Scott Wagers)

exercise planners are working to replace the legacy of the Cold War, including so-called campfire exercises

How Training Failed

Increased operating and personnel tempo and decreasing resources led EUCOM to examine training. High tempo was considered to have a negative impact on readiness, and it was thought that an overextended exercise program contributed to the problem. The review identified requirements and compared them to exercises to determine if the existing program decreased readiness. It found that several exercises did have a deleterious effect.

Although it initially seemed that there were too many exercises with the same objectives, a closer look indicated that there were too many requirements for available forces and budgets. And a detailed survey revealed that the rationale for legacy events was complex. Many were classified as readiness exercises but were designed to improve capabilities. Still others were dubbed as security cooperation events and were largely designed to improve political-military relations between the United States and other nations. While it was known that some exercises focused on readiness and others on the campfire, neither the events nor the requirements were created equally.

U.S. forces participated in most European tactical level exercises because of the access to excellent training ranges, unique deployment prospects, solid coalition/interoperability training, and operational use of geostrategic sites. Opportunities to fly with and against MiG–29s, train with live-fire rockets from attack helicopters, or deliver ordinance at night are attractive. At sea, commanders and crews of American vessels openly maneuvered, signaled, and tracked Allied or PFP ships in northern and eastern waters. But other exercises were important politically and provided visible support of NATO or other treaty obligations, afforded rare opportunities, or were directed by the Secretary of Defense, Joint Staff, or combatant commander.

It also became clear that other exercises remained on the schedule because of the inertia in budgets, planning, and bureaucracy. Exercises dropped off the NATO schedule but remained on the U.S. calendar as bilateral or single-service events. Others, like PFP exercises conceived in 1994, had outgrown their usefulness. In some cases only a few Americans participated, but the services expended a disproportionate level of resources in supporting deployment, participation, protection, sustainment, and redeployment. Some events, like exercises based on contingency operations plans, were based on Soviet-era threats that appear anachronistic.

F–15s and MiG–29s, Sentry White Eagle.

U.S. Air Force (Jerry Bynum)

One complicating factor was determining the service-level, joint, bilateral, and combined nature of exercises. Many nominated by EUCOM for inclusion on the CJCS-directed list were not purple. They were service-oriented events that received CJCS-dedicated funding but offered little joint training. Often exercises were combined in name only or were classified as such by virtue of the presence of Allied liaison officers. Furthermore, several bilateral exercises were not joint and combined in nature. As a result of these findings, EUCOM discontinued such events as command-sponsored exercises to relieve the high-tempo problem.

Factors and Obstacles

There has been an almost mandatory commitment of critical resources and capabilities by the United States in NATO exercises. In the case of PFP efforts, participation extends access to Warsaw initiative funds. Without subsidies for travel, rations, and supplies, the involvement of these members would often be limited. Without their participation there would be no exercises since security cooperation with such nations is a primary objective.

A different situation surrounds NATO-only exercises, where Allied planners must factor high demand/low density U.S. assets into the equation. The American inability or unwillingness to share deployable communications, satellite access, precision approach radars, aerial refueling, Patriot missiles, Apache Longbow helicopters, EA6–B Prowler aircraft, or Marine expeditionary units not only reduced training realism, but also strained Mons-Stuttgart and Brussels-Washington relations. The Armed Forces were reluctant to use these capabilities only as training aids for the less capable members.

Another difficulty arose as a result of changes in the NATO command structure in 1999, which reduced the number of commands, reorganized second level headquarters, and divided Europe into northern and southern regions. Although these changes were a positive step toward recognizing the new international security environment, exercises were not reduced in proportion to headquarters. New subregional joint commands were created, and training their commanders and staffs added events to the schedule. This misalignment resulted in inefficient participation by the United States in the overall exercise program.

American participation in CJTF exercises is usually limited due to the competition for resources

A further complication is competition between the NATO combined and joint task force headquarters concept and the EUCOM joint task force training model. Both concepts have been developed on parallel tracks for several years but have never been coordinated or sequenced.

NATO and EUCOM exercises are capstone events for both commands. They are approximately equal in size, train to similar objectives, and are closely timed each year. On one hand, the JTF model is based on delegating authority through a service component command and usually passed down to a one-, two-, or three-star headquarters. On the other hand, the CJTF headquarters derives from an existing joint headquarters. While command JTF missions focus on a full spectrum of operations, from warfighting to noncombatant evacuations, CJTF scenarios are uniformly based on corps-sized crisis response operations. American iterations are at least one generation of technology ahead of Allied exercises and are experimenting with simulated and live forces even though the computer and information system support for both programs is substantial. American participation in CJTF exercises is usually limited due to the competition for resources and the perceived cost-benefit ratio for potential U.S. participants.

***USS Kearsarge* in Mediterranean.**

U.S. Navy (Martin Maddock)

The exercises have common training objectives and demonstrate that there is room for increased cooperation despite differences in levels of command, operational reach, scenario, and technology. Under the right leadership, exercises could inform each other, share assets, and go a long way toward transforming Alliance and U.S. capabilities to command multinational forces.

Ready for What?

The problems went beyond managing resources or synchronizing exercise cycles. One lies in a misalignment between NATO objectives, headquarters structures, force capabilities, and the subsequent inability of the exercise program to reflect changes. U.S. commitment to NATO through the force planning process is a prime example.

The United States and other members of the Alliance offer forces for future operations through a structured process, which works in support of Article 5-based collective defense plans, designed to defend NATO from the Warsaw Pact. Clearly, this process has not kept up with new concepts and threats. The current strategic concept, for example, envisions out-of-area and crisis response operations over traditional warfighting operations. It calls for more rapidly deployable forces but has been slow in eliminating old formations and establishing responsive capabilities. Consequently, U.S. forces are exercising against old concepts and requirements until NATO gets its vision of the future worked out.

In addition, no consensus exists between the national and NATO planners on the primacy of crisis response versus Article 5 missions. Collective defense is the raison d'être for NATO, and it did not go away when the crisis response mission was introduced. Its nature has changed, however, and 9/11 destroyed preconceptions about traditional Article 5 missions.

But the path to improved readiness is marked by promising signs about NATO force structure and the graduated readiness force concept. In its land-based form, eight member nations have volunteered corps-sized formations at varying levels of readiness as a multinational contribution. Properly trained, organized, equipped, and employed, these forces should be better suited to cope with the crisis response missions envisioned in the strategic concept.

One challenge will be adjusting the NATO exercise program to meet the requirements of eight corps-sized headquarters. They must be trained before integrating them into the command and control structure, which will add to an already full schedule. Training all eight on a range of possible missions will take not only time, but support and large budgets. Until headquarters and force structures are synchronized with the NATO strategic concept, exercise planners must work on the margins of an outdated model and will be unable to deliver trained, ready, and transformed headquarters and forces.

Transforming Exercises

Because canceling exercises while awaiting force and command structure realignment is not feasible, EUCOM has focused on more realistic approaches. The first major step in getting the exercise program to better support readiness was reducing the number of exercises that were not

clearly traceable to a EUCOM or component joint mission essential task (JMET), a treaty obligation, or an event directed by the Secretary of Defense, Joint Staff, or combatant command. This scrub of non-JMET exercises revealed only a few events with little or no training value. As a result, EUCOM eliminated six of its 82 CJCS exercises. To make further reductions, it became necessary to decrease exercises based on other criteria, including the inability to address multiple training objectives or audiences. Withering resources—both service-specific incremental funds intended for joint exercises and the strategic lift resources that combatant commanders draw on to execute their programs—helped focus this effort.

The second step was working with Allied planners to forecast and determine a priority for U.S. resources inside the NATO program. A concurrent objective was the modernization of both programs based on the realities of the mission spectrum. Once EUCOM approached NATO with its shrinking resources, the latter was helpful in providing preferences on U.S. participation and capabilities. This also allowed NATO to examine its program. It should be noted that EUCOM participated in only 15 out of a hundred scheduled exercises. In most of them, U.S. headquarters and forces were not needed because other members could furnish a similar contribution. In some instances, Alliance capabilities, like the airborne warning and control system (AWACS), offered the same trained and ready asset at a lower cost.

Closer collaboration with NATO planners also included coordinating with the partnership coordination cell. It became obvious that the United States was often a key participant and could not withdraw from cooperation exercises because it was more often on the giving than receiving end of quality training. One example is a NATO/PFP exercise with a primary objective of developing PFP squad- and platoon-level tactics, techniques, and procedures. This exercise is atypical for a joint exercise focus and thus threatened further U.S. participation. Ultimately, that training allows PFP members to interoperate with other nations during peace support operations such as those in Bosnia, Kosovo, and Afghanistan. Recognizing that most members have moved beyond campfire exercises by contributing to security commitments has helped in retaining a few unique exercises. NATO has recognized the progression of the PFP program and recently called for a more operationally focused partnership, allowing more vigorous training.

Other NATO or PFP exercises without immediate connections to current operations were less fortunate. Exercises with an overly service-unique or specific focus lost support. Maritime logistic, communication, or medical interoperability training, for example, is obviously needed, but given the reduction in resources these stand-alone exercises are being forced into often unwilling cooperation with larger, multiobjective, multiechelon training events.

The final significant decision reduced PFP and bilateral exercises. After examining the cost and benefit of most command-led, owned, and operated exercises, it became clear that many had lost their luster. In several cases the host countries had gained entry to NATO (and needed integration into pure Article 5 exercises) or evolved their militaries beyond the campfire and to the point where they warranted regional exercises focused on more complex tasks and scenarios. With some countries, like Ukraine, the command has little room to modify the program.

Austrian tank during Strong Resolve '02.

U.S. Navy (George Sisting)

the reduced bilateral, single-service, and PFP exercise program succeeded because there was a parallel NATO program

EUCOM–NATO Relations

The reduced bilateral, single-service, and PFP exercise program succeeded because there was a parallel NATO program into which it could be integrated. Although the Alliance program does not meet all command requirements, the decision to work within it for improved readiness was perhaps unique to European security. The reduction also was possible because of increased collaboration between U.S. and Allied exercise planners on all levels. This approach has solid capacity to influence readiness in the context of the Alliance but has its limits. U.S. participation in the program could overwhelm other NATO members, but EUCOM realizes its shortcomings. The remaining issue will be the speed with which organizations adapt to changes precipitated by the new strategic outlook, headquarters, and force structure.

AH–1W on artillery range, Alexander the Great.

U.S. Navy (Martin Maddock)

Consequently, there are three areas where EUCOM could team with NATO efforts:

- examining CJTF requirements, exploring synchronization, defining national roles on CJTF staffs, and exercise requirements
- integrating future readiness force exercises into existing NATO exercise programs
- reviewing PFP exercises to include more complex readiness and interoperability scenarios as national capabilities develop.

EUCOM is supporting efforts to examine exercise and training requirements; and by leveraging his dual role, the Supreme Allied Commander Europe and Commander, European Command, can continue or even accelerate transformation. The efforts outlined above may result in a European solution but will likely have limitations outside the theater.

Command Implications

Besides its implications for NATO leaders, several U.S. commands draw on the EUCOM experience. Commanders on all levels should be mindful that vigilance in reviewing objectives and requirements is integral to transforming capabilities. Only in this way can they ensure that their programs are improving readiness.

Respecting allied or coalition member requirements and working within their constructs has proven vital to military capabilities and political cohesion on which militaries build programs and accomplish missions. Developing training and exercises to support the strategic concept of a command may seem fundamental to defense planning, but the path linking strategy to structures to forces and finally to an exercise program is ridden with fiscal and bureaucratic obstacles.

Perhaps the most interesting implications of the EUCOM effort involve U.S. Joint Forces Command (JFCOM). Millennium Challenge '02 furthered the transformation of the warfighting capabilities of combatant commanders. Many issues arose in the exercise: creating multiechelon and multifunction training venues, organizing headquarters to deal with transformation, mixing live and simulated forces, conducting collaborative planning, matching different hardware and software, and establishing more responsive headquarters and decisionmaking processes. JFCOM is also tackling the commensurate rise of technical problems such as trained personnel, increased bandwidth requirements, and space systems support, areas in which the United States has a clear advantage over its allies. The exercise did not answer every question it posed, but the command is engaged in transformation and should deliver improved capabilities to combatant commanders. In particular, EUCOM can provide JFCOM with input on both Alliance and multinational issues as well as receive the benefits of national transformation.

Finally, the recent NATO decision to create a functional strategic command to deal with transformation may provide the missing piece in the exercise and readiness puzzle. Along with the decision to separate the responsibilities of the Commander, Joint Forces Command, from his duties as Supreme Allied Commander Atlantic came an initiative to create another headquarters with similar functions. The NATO transformation command could provide a formal mechanism to transform a range of military capabilities. It is a work in progress, but this organization will go well beyond the scope of joint exercises and training.

Because of the dual-hatted role of its commander and unique relationship between staffs in Belgium and Germany, the Chairman assigned EUCOM the coordination and integration task for "U.S. participation in European NATO exercises and exercise-related studies." These events are small steps in transforming readiness and depend on aligning forces, structures, and strategic objectives. As the Commander, European Command, testified before the House Armed Services Committee, "Transformation is an ongoing process, however, not an endstate. It spans decades of innovation and experimentation. It is also not limited to technology, but includes change in our organizational structure, operational concepts, and business practices."

U.S. European Command is transforming its exercise programs to reflect contemporary mission requirements by continuing to deepen relations between its staff and NATO planners. Further work is needed to modernize the requirements in light of ongoing operations. Although the initiatives in the EUCOM exercise and training program review are evolutionary rather than revolutionary, they represent tangible evidence of military transformation in preparing for the next war, not the last one. **JFQ**

Intelligence Support for Military Operations

By MARKUS V. GARLAUSKAS

Refueling U–2, Iraqi Freedom.

1st Combat Camera Squadron (Matthew Hannen)

Joint operations will demand an unprecedented level of intelligence support in the future. Like other aspects of jointness, this asset will not only require improvement but transformation. Moreover, it will require more than keeping ahead of potential enemies. If the obstructive patterns found in the system are not overcome, the gap between needs and capabilities could compromise the ability of the joint force to successfully conduct a full range of operations.

Statements by various proponents of intelligence support have created great expectations. The Quadrennial Defense Review (QDR) identified exploiting intelligence advantages as one of the four pillars of military transformation. Senior leaders and defense specialists anticipate that commanders will be able to receive markedly faster and more detailed intelligence on a situation, which is known as information

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superiority. *Joint Vision 2020* states that information superiority is fundamental to achieving the necessary capabilities. Thus it is vital to examine the challenges to making that vision a reality.

The Armed Forces must assume a central role in transforming intelligence. An increased reliance on national intelligence agencies has denied control to commanders and limited input by fielded forces. Those leaders responsible for transformation must establish realistic expectations for future support based on the resources provided. In the past, military expectations have been exaggerated given the means at hand, setting the stage for failure. Moreover, transformation must create an anticipatory support system, which is prepared both geographically and functionally for various missions. Intelligence often does not adequately support military operations other than war or deployments to unexpected environments. Finally, institutional inertia must be overcome. The necessary changes can be made, but time is running out. Transformation is continuing, and expectations for support are increasing daily.

a heavy reliance on national agency support will hamper the command and control of supported commanders

The Military Role

Some regard transforming intelligence as synonymous with military transformation, with the same dynamics, goals, and characteristics. Because of this mistaken belief, many proponents of military transformation expect the intelligence community to lead the way in the evolution of intelligence support. As Admiral William Owens, USN (Ret.), a former Vice Chairman, viewed the situation, "The U.S. intelligence community must either seek to lead and promote the on-going transformation of the military or bear much of the responsibility for a U.S. failure to seize the opportunities provided by our lead in military technologies."[1]

This approach must change or the Armed Forces may be left without intelligence support to meet their needs. National intelligence agencies—which are neither commands nor part of the military intelligence apparatus—have various customers, interests, and priorities beyond direct support to joint operations. In addition, as the National Reconnaissance Office has reported, "[A support] system designed by intelligence experts, rather than military operators, would most likely be based on the information that can be provided, and it could be ignorant of what information is actually needed for operational decisionmaking."[2]

Since the Cold War, commands have sought intelligence from outside their organizations to an unprecedented degree. Intelligence staffs on the tactical level derive limited benefit from intelligence that originates in higher headquarters because senior-level staffs increasingly turn to agencies on the national level to meet the demands of their commanders.

This change was accelerated by the Persian Gulf War. The massive requirements of the air campaign led U.S. Central Command (CENTCOM) to depend on the national agencies for an unparalleled level of support. National agencies offered considerable intelligence resources, but the results were less than satisfactory. That experience may have led the services to invest more in intelligence capabilities, but budget constraints produced the opposite result.

As the Cold War ended, national intelligence agencies demonstrated their capability and willingness to increase the emphasis on support to military operations as they sought post-Soviet missions to protect budgets. Military leaders were meanwhile looking for ways to cut spending in order to minimize the impact on force structure and combat power. Expecting increased support from the intelligence community to mitigate any shortfalls, the services drastically cut intelligence assets. The intelligence community, with the support of the President, made supporting military operations its top priority in response.

Despite budgetary benefits, this arrangement will present problems for the joint force if it continues. First, painful resource conflicts between commanders and other national intelligence customers are becoming inevitable. Second, a heavy reliance on national agency support will hamper the command and control of supported

Counterair briefing aboard *USS Harry S. Truman.*

Fleet Combat Camera Group, Atlantic (Michael W. Pendergrass)

commanders, who cannot normally directly task most national resources. More generally, overreliance on national agencies will limit the desire and ability of the military to shape the response to increased intelligence support needs.

The impact of these issues was minimized when the military was the unrivaled number one customer of the national intelligence agencies. However, those days are now numbered if not over. As far back as 1996, the *IC21* congressional study concluded that a heavy emphasis on support for military operations was crowding out other intelligence customers. With the global war on terrorism, many of those customers now have increased priority. National agencies will be expected to support law enforcement agencies and coalition partners hunting terrorists as well as enemy units. Similarly, national-level support to force protection for U.S. units deployed overseas will increasingly take a back seat to warning of terrorist attacks at home. A moderately increased top line in the intelligence budget will do little to offset resource conflicts generated by realignment.

As the new priorities come into play, commanders will find that they actually exercise very limited control over national intelligence support. In the past, unified commanders have been able to use voluminous and insistent submissions of intelligence requirements and requests to national agencies to exercise de facto control over national assets. Commanders may find that the information which is expected is unavailable because applicable national resources have been devoted to other strategic priorities on short notice. Unlike the military, the national intelligence agencies do not have significant uncommitted resources for crises, so when a new requirement emerges, resources must be quickly pulled away from other tasks.

Even if conflicting requirements only rarely lead to unexpected drops in national agency support, a similar problem arises from the inability of commanders to fully control that support. According to joint doctrine, commanders are expected to coordinate and control support. While national agencies are central to the intelligence effort, it is difficult to achieve such control in practice. During the air campaign in Yugoslavia, the Supreme Allied Commander Europe, General Wesley Clark, USA, exercised no control over organizations that recommended targets for the Allied Force. When the Chinese embassy in Belgrade was attacked, Clark had to deal with the consequences. If a joint force commander does not control the conduct of intelligence support, how can he

control operations? Obviously this issue must be addressed and better arrangements must be worked out even if military dependence on national agency support is reduced.

Transformation leaders cannot expect exponential increases in responsive and effective intelligence support while leaving it solely to the national intelligence community. If the joint force of the future needs more operational intelligence support, it must be paid for out of service budgets. More capable military intelligence organizations must be equal partners with national agencies, enabling them to better represent their interests in transforming intelligence community capabilities. This may lead the Armed Forces to exercise more control over some national resources as necessary. Military leaders must show that they are equal to this challenge by paying careful attention to the intelligence aspects of transformation.

joint forces will be expected to select, spot, identify, track, and strike targets that will achieve decisive effects

Expectations

Intelligence failures draw popular attention. What goes unsaid, however, is that flawed expectations can lead to failure. If expectations are unclear, or unachievable based on available resources, military transformation will not achieve its promise, which probably will be proven on the battlefield. Identifying such a setback as an intelligence failure would be small consolation. To avert this situation, military leaders must exert a leading role in setting expectations for their intelligence support.

History has provided transformation leaders with ample warning. Each successive iteration of U.S. warfighting doctrine since World War II has held out higher expectations which were not fully met. With the heavy reliance current transformation efforts place on intelligence, the emerging generation of doctrine could be the worst example of this pattern yet.

The roots of excessive confidence in intelligence support are found in World War II. The military opinion of intelligence improved rapidly after Pearl Harbor. The postwar lifting of secrecy brought some intelligence coups to light, including the breaking of enemy codes. Decisive victories at Midway, the Battle of the Atlantic against German U-boats, the invasion of Sicily, and even the Normandy landing were attributed to superior intelligence.

When military doctrine was revised in the 1950s, this optimistic view of intelligence would be apparent. Pentomic doctrine envisioned battlegroups dispersed to minimize their vulnerability to nuclear strikes, with the gaps covered by improved surveillance and intelligence directing long-range firepower. Meanwhile, doctrine shifted from retaliation against cities to rapid strikes against hard-to-find targets, including delivery systems.

At the time new doctrine was adopted, U.S. intelligence could not meet targeting support requirements. A massive improvement program directed by President Dwight Eisenhower led to revolutionary overhead cameras, new platforms, and more photo-interpreters—but only partially solved the problem. U-2 aircraft and the Corona satellite provided some ability to find and track strategic targets inside the Soviet Union; however, no assets were deployed to meet the tactical targeting needs of Pentomic doctrine before it was abandoned years later.

Such problems were often repeated, most notably in developing AirLand Battle doctrine, which required quickly finding and selecting targets deep in enemy territory in rapidly changing situations. AirLand Battle anticipated strikes on mobile high payoff targets such as command and control vehicles. Moreover, it expected highly accurate bomb damage assessment (BDA) to allow rapid reengagement of surviving targets without wasting deep strike capabilities.

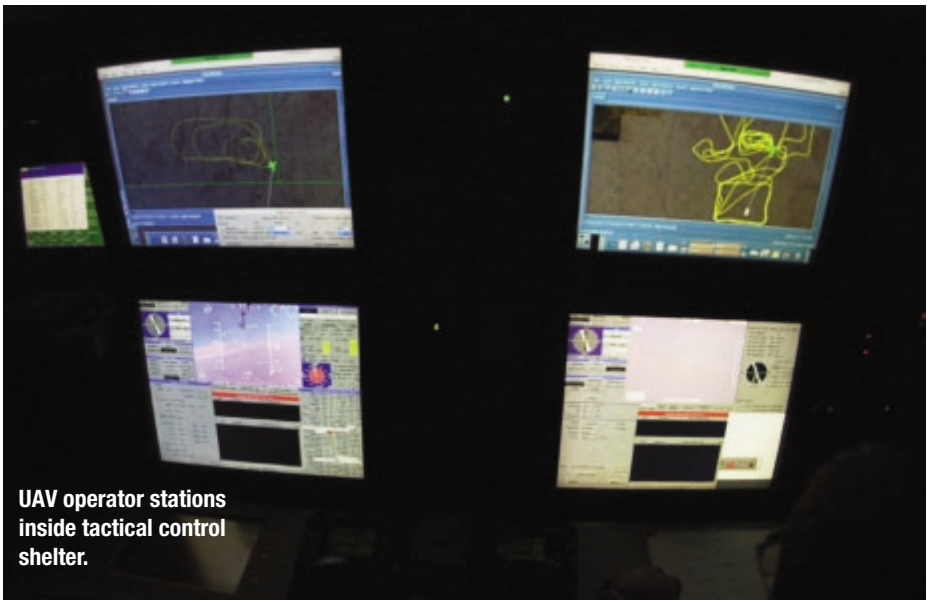
The intelligence capabilities required were not in place, and unlike in the 1950s there was no crash program to develop them. It was almost a decade after the adoption of AirLand Battle before assets such as the joint surveillance target attack radar system (JSTARS) aircraft made it possible to monitor movements deep behind enemy lines in near-real time. But improvements in technical collection did not solve every problem, as Desert Storm showed.

The comments of senior leaders during the Gulf War illustrated the level of expectations. General Norman Schwarzkopf, USA, and General Charles Horner, USAF, admitted that success would not have been possible without unprecedented intelligence support. But in virtually the next breath they said that expectations were not met in key areas. Horner, who directed air operations, lambasted poor intelligence support for targeting. Similarly, Schwarzkopf testified before Congress that the BDA system was abysmal.

Desert Storm revealed that effectively tracking key mobile targets, a major component of AirLand Battle, was a remote goal. After launching hundreds of missions against mobile Scud launchers, it is still impossible to confirm if any were destroyed. Years later, during the NATO bombing of Kosovo, U.S. forces still did not receive support to consistently identify and strike mobile targets from the air, while indications from Afghanistan are that the problem has yet to be fully resolved.

High expectations for intelligence to support targeting and BDA has continued with the focus on precision engagement in *Joint Vision 2020*. Joint forces of the future will be expected to select, spot, identify, track, and strike targets that will achieve decisive effects, assess the results, and then quickly reacquire and reengage surviving targets as necessary. Further, the joint force is expected to accomplish these tasks with overwhelming speed and throughout a full range of military operations—while minimizing collateral damage and fratricide.

The main condition to achieving this vision of precision engagement is intelligence. The Armed Forces have developed and proven the capability to strike targets rapidly, once identified. However, experience with precision strikes in the Persian Gulf, Kosovo, and



UAV operator stations inside tactical control shelter.

1st Combat Camera Squadron (John Houghton)

Afghanistan have demonstrated that the joint force can hit targets more consistently and quickly than it can identify and select targets. Poor BDA has also meant that no one knows what was really accomplished in a given strike for months if ever. In short, doctrine is ahead of intelligence support again.

It will require tempered expectations and increased capabilities to bring the two factors into closer alignment. If the military allocates sufficient resources and attention, intelligence capabilities may be able to realize the expectations of *Joint Vision 2020* by the appointed year. However, in the intervening years, doctrine must reflect—and commanders must estimate—goals for intelligence support.

Transformation leaders must also be specific in communicating their vision of the future. This will mean assessing intelligence support needs for various contingencies in doctrinal terms rather than in terms of the technological capabilities available for exploitation. Without precise guidance on future needs, the national intelligence agencies will choose to build capabilities based on their priorities, while military organizations will not be able to optimize structures, doctrines, and training programs to best accomplish their missions.

Anticipatory Support

The Armed Forces have made great strides in the physical ability to rapidly project power over vast distances as well as deploy and sustain forces in areas with little preexisting infrastructure. They have made far less progress toward rapidly meeting intelligence support needs for operations in all but the highest priority locations and missions. To address this problem, the Armed Forces must build a system that anticipates and prepares for, not reacts to, the challenges of an increasingly diverse threat.

Since World War II, U.S. forces have been frequently deployed to places regarded as low intelligence priorities until the outbreak of a crisis, which has meant that intelligence organizations were unprepared to provide support. Similarly, the intelligence support system has had problems meeting the unique demands of missions other than the full-scale traditional warfare for which it was designed. These shortcomings have become obvious in non-war military operations in various parts of the world since the Cold War.

Both the breadth and flexibility of U.S. intelligence is currently limited. The increasing cost of collection platforms results in fewer entering the inventory. It is impossible to adequately cover every location where forces may be deployed. Therefore, increasing coverage in a crisis leads to sacrificing attention elsewhere and possibly missing warnings of other crises.

As with platforms, there are fewer people to go around than before budgetary cuts began. More importantly, analysts are not universally interchangeable between regions and specialties. Specialized expertise on deployment areas or the surrounding regions is vital for good collection and analysis. This knowledge has normally been in short supply when unexpected events cause forces to be deployed because most intelligence personnel have been trained and conditioned to deal with just a few longstanding threats.

When North Korea invaded the South in 1950, the U.S. intelligence system was unprepared to meet the human requirements for operations on the peninsula because it had been focused on Europe. A study of lessons learned during the Korean War revealed a critical shortage of trained linguists in the Army.[3] The National Security Agency (NSA), which provides signal intelligence to the military, had only one analyst tasked to cover Korean message traffic and only one trained Korean linguist at the outbreak of the conflict.

Forty years later, little had changed. When Iraq invaded Kuwait in 1990, DIA had only one analyst assigned to Iraq fulltime. When forces were deployed to Somalia the following year, CIA had to send case officers who did not speak the language and had little knowledge of Somali history or the clans which ran the country. Military intelligence units were so short of trained personnel that they relied on Somali civilians as interpreters, some of whose backgrounds tainted the resulting intelligence.

Even after troops are deployed and an area becomes an intelligence priority, experience demonstrates that it can take a long time to overcome a lack of advance preparation. Intelligence organizations will quickly assign collectors and analysts, but recruiting and training area experts and linguists can require years, and building an effective human intelligence (HUMINT)

network calls for patience and persistence. Cultivating, placing, and evaluating the reliability of human sources is best done over a long period. Rushing the process to support operations which are underway can compromise effectiveness, as became clear in Somalia. Among other issues, HUMINT support for Task Force Ranger led to hitting the wrong targets several times, including a pro-U.N. Somali general.

Reliance on HUMINT in Somalia also illustrated that various types of operations call for different requirements and present unique challenges. Such missions can be best addressed with methods, structures, and equipment optimized for the task at hand. For example, requirements in Somalia could only be effectively met by human agents, leading the U.S. military to depend on comparatively weak HUMINT capabilities. In other situations, such as large-scale conventional wars, electronic sensors might be more useful.

intelligence transformation has focused largely on using new technologies to gather and distribute raw information

The full spectrum dominance invoked by *JV 2020* means the intelligence system must be able to support any type of operations on short notice. But the system is trained and organized today to support large-scale conventional warfare and can only be temporarily or marginally modified to support other missions. The Armed Forces are beginning to make significant changes, such as the increased HUMINT capabilities of the Stryker brigade combat team within the Army. Further progress will require broader training and more flexible organizations, as well as units that can support particular missions and be ready for attachment to deploying forces.

Moreover, the joint force must lay the intelligence groundwork for supporting operations in areas that may not be priorities today. In many places where the military will be deployed, and some where they are currently deployed, there are insufficient HUMINT and other specific resources. A relatively small long-term investment in recruiting and training area specialists and better monitoring lower-priority areas may provide substantially improved support when the time comes to deploy on short notice. By careful analysis, areas that may become crisis spots can be identified to receive greater attention with enough lead time to put the groundwork in place.

There will be resistance to this anticipatory approach. It would take resources from other concerns and training from conventional warfighting support. In addition, most of the assets would come from the military. The national agencies are focused on current requirements and cannot dedicate more than a token effort to areas that might only potentially be critical to military customers.

Despite the expense, if a predictive approach is not pursued, joint forces will find it difficult to achieve information superiority in the future. Local and regional threats have a significant home ground advantage that has historically overcome the U.S. intelligence advantages alluded to in the QDR report. Transformation leaders cannot afford to concede information superiority to an enemy at the outbreak of a crisis because of reluctance to pay the costs of better preparing for a wide variety of contingencies.

Overcoming Inertia

In meeting these challenges, transformation leaders will encounter cultural, budgetary, and organizational inertia. Many patterns must be changed to achieve transformational advances in intelligence support of military operations. Some have already been considered, while others may only have a minimal impact on transformation. Yet two problems require special attention: the preference for high-tech collection and communication over other forms of intelligence and the relatively low priority intelligence is assigned within the military.

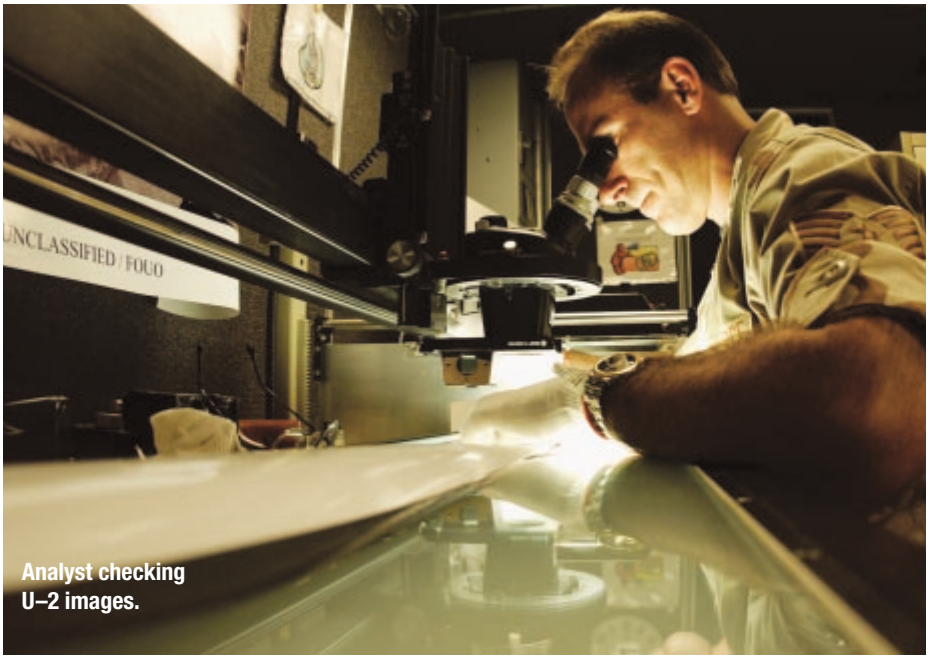
It has long been part of the intelligence culture to prize collection over analysis, and technical means of collection in particular have dominated budgets. Similarly, the defense establishment has a strong tendency to equate fielding advanced technology with transformation. As a result, intelligence transformation has focused largely on using new technologies to gather and distribute a flood of raw information, which the United States already does fairly well.

Leaders insist that the intelligence focus is moving toward more personnel and analysis, but technology and collection still receive most of the funds—along with the power and prestige. Of nine programs cited as key transformation initiatives by the Transformation Study Report in 2001, only the Army distributed common ground system was not a technical sensor or platform. Designed to improve intelligence processing, analysis, and dissemination, this system was only assigned as a C list priority.[4]

When combined with the traditionally secondary status of intelligence in the military, this bias can have damaging effects on transformation. One has been the funding and attention devoted to enhancing sensor-to-shooter links, such as connecting fighter pilots with real-time imagery from platforms. This approach to the transformation of the targeting process wastes limited resources and is partially driven by the desire of shooters to limit reliance on intelligence personnel.

Shooters already have sensors, and providing more raw unanalyzed sensor data will solve few of their problems. Linking warfighters directly to additional sensor information means little without the analytical capability to accurately determine what the sensors are actually looking at. Trained imagery analysts who had ample time were deceived in Iraq, Kosovo, and Afghanistan, and shooters under immediate threat will be far less effective analysts. Worse, the transmission of all this data will place huge and unnecessary demands on overburdened communications networks, not to mention the attention of the shooter.

It would be more useful to focus technological resources on helping those personnel who now see sensor



Analyst checking U–2 images.

1st Combat Camera Squadron (Reynaldo Ramon)

data to identify targets more accurately. Substantially more effective automatic target recognition software and hardware would enhance data exploitation from existing sensors and platforms, improving intelligence application across the board. At the same time, more effort should be devoted to improving analyst-shooter links for warfighters to get valuable finished intelligence more quickly.

Even when technology connects shooters with virtual or human imagery analysts to help identify targets in real time, sensor-to-shooter links do not resolve the targeting support problem. Effective targeting in an age of precision warfare is more complicated than simply finding things that belong to an enemy and designating them for attack. U.S. precision strike capabilities are finite and must be directed at the most important targets to be decisive. As *Joint Vision 2020* states, "success depends on in-depth analysis to identify and locate critical nodes and targets."

Improvements in processing, analysis, and tasking—not more raw data—are the keys to achieving transformational improvements in intelligence. Billions of dollars are to be spent on more unmanned aerial vehicles, satellites, and advanced sensors, while it is clear that intelligence organizations lack the manpower to thoroughly examine even a small fraction of the information currently collected. A more appropriate approach would redirect resources to building a system that more efficiently uses the collection capacity. That would focus tasking more tightly on areas likely to contain vital pieces of information, improve processing to speed their identification, and provide the analytical resources to interpret what they mean more reliably and completely. That would provide better intelligence without increasing the amount of information collected.

Technology may find its optimum contribution in streamlining the labor-intensive task of information processing. Deploying improved automatic target recognition, electronic language translation, virtual collaboration, and data mining technologies would yield savings in manpower and time and result in greater effectiveness. Ultimately, the processing, analysis, production, and storage of intelligence can and should be far more automated.

The final transformational step would be creating a common intelligence knowledge base to allow analysts from different organizations to securely, quickly, and efficiently access all raw intelligence and finished products. Once the obstacles to sharing among agencies are overcome, this shared knowledge would help resolve many problems inherent in interagency cooperation without sacrificing organizational independence. Military intelligence could get increased value from national agency resources without contesting control. Analysts could continue to provide analysis tailored for their organizations but without having access to only part of the information collected on the subject.

Transformation will be a difficult process unless the Armed Forces accept intelligence as an equal partner of other aspects of joint operations. During successful military transformations, new relationships are formed among the various arms of each service. The current situation is no exception. A sustained effort will be required to substantially increase the level of attention and resources that intelligence receives within the military. If intelligence support is becoming more vital, it must assume an increased priority across the defense establishment. The challenge can be met—and intelligence can fulfill its promise as the foundation of military success. **JFQ**

NOTES

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Global Hawk in Australia, Tandem Thrust '01.

U.S. Air Force (Jeremy Lock)

Unmanned Combat Aerial Vehicles and Transformation

By JOHN J. KLEIN

Speaking in December 2001, President George Bush noted the changes that are occurring in the Armed Forces as the result of technological innovation: "Now it is clear the military does not have enough unmanned vehicles. We're entering an era in which unmanned vehicles of all kinds will take on greater importance—in space, on land, in the air, and at sea." The need for unmanned combat air vehicles (UCAVs) was illustrated by recent operations in Southwest Asia that employed Predator unmanned aircraft with Hellfire missiles. Although no naval UCAVs currently exist, this shift implies that the sea services must determine their strategic capabilities to avoid using them when manned aircraft or other weapon systems might be more appropriate.

Congress has mandated that a third of deep strike capability be unmanned by 2010. And although the Pentagon indicated that it cannot meet the deadline, significant resources have been earmarked for this purpose. Overall funding is more than $1.1 billion in 2003, and the Navy requested $50 million for its program in 2003, an increase of $8 million over the 2002 budget level.

Several factors have contributed to the anticipated boom in naval UCAVs. The Predator reconnaissance UAV was successfully modified with Hellfire air-to-ground missiles and employed in Afghanistan. Also, technology has advanced to the point where it is feasible to use unmanned vehicles for naval combat operations. Finally,

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naval vehicles have an advantage over land-based counterparts since the Intermediate Range Nuclear Forces Treaty of 1988 prohibited certain land-based cruise missile-like systems but not ship-based systems.

Current Initiatives

The Navy leveraged innovations in unmanned programs by the Air Force and the Defense Advanced Research Projects Agency. Presently, naval requirements address carrier-based UCAVs to suppress enemy air defenses, perform strike missions, and conduct intelligence, surveillance, and reconnaissance (ISR). A notable difference among service requirements is that Navy specifications include such capabilities, while those of the Air Force do not. One reason for this disparity is that the Air Force utilizes other vehicles such as the ISR-proven Predator and Global Hawk.

requirements call for vehicles with a strike radius of 1,000 nautical miles and a payload of 2,000 pounds

The Office of Naval Research and the Defense Advanced Research Projects Agency have selected Boeing and Northrop Grumman to produce the UCAV advanced technology program demonstrator. This program will lead to the development of a system that could become operational by 2015. Requirements call for vehicles with a strike radius of 1,000 nautical miles and payloads of 2,000 pounds (including joint military munitions and new small diameter bombs). Naval guidelines also require UCAVs to perform a 12-hour ISR mission and operate up to altitudes of 35,000 feet. These vehicles will be the same class as F/A–18C aircraft and should have a unit cost one-third that of the joint strike fighter and an operational support cost half that of an F/A–18C squadron.

While the Marine Corps has no current UCAV programs, it has several under development. The requirements call for a family of inexpensive, man-portable vehicles for the battlefield. Dragon Eye, for example, weighs four pounds, has a three-foot wingspan, and is designed to operate at 35 knots with an endurance of one hour. Its one-pound sensor payload can provide day, low light, or night infrared sensor imagery to ground operators. After combat operations in Afghanistan, the Marine Corps sought to use Dragon Eye to support security forces within Kabul, and current plans call for fielding over 300 systems.

Quantifying the Qualitative

Military transformation is a revolutionary or significant improvement in hardware, tactics, or doctrine. In a period of technological breakthroughs, slowly evolving militaries run the risk of being overtaken by enemies that risk all on revolutionary changes. These visionaries seek a force that is lighter, more mobile, and more easily deployed to hotspots around the world. While the military has climbed aboard the transformation bandwagon, the term has been misapplied and even tied to acquisition programs as a way of avoiding criticism and budget cuts. Overuse and misuse have understandably obscured the intended meaning.

Some claim that UCAVs are not transformational but rather the next step in the incremental evolution of aircraft. To prevent pundits from arguing which programs are transformational and to decide if the vehicles have a significantly improved capabilities over manned aircraft, it is desirable to put a stake in the ground and quantify this nebulous claim. Borrowing from engineering and the applied sciences, which routinely perform numerical calculations, the equivalent to transformation is likened to an order of magnitude change, which denotes significant or notable measurable change. Taking the most conservative approach to quantifying transformation, an order of magnitude change with the base 2 numbering system will be used to define transformation, thus denoting a measured doubling or halving.

Applying this thesis, unmanned vehicles are considered transformational if they achieve at least a twofold improvement in cost or capability over manned aircraft. For instance, if UCAVs perform a similar mission for the same price, with twice the endurance as their manned counterparts, they can be considered transformational. In addition, if an unmanned vehicle carries out missions similar to manned aircraft but at half of the cost or less, that could be transformational. An exception occurs when one capability is improved and another is lessened. If a vehicle has twice the endurance as a manned strike aircraft but costs twice as much, this is not transformational since two sequential sorties of the cheaper manned aircraft would provide the same coverage as the longer endurance UCAV. Therefore, improving the performance of unmanned aircraft at any price is not in keeping with the objectives of military transformation.

An exception to quantifying transformation occurs when the novel capability of unmanned vehicles cannot be quantitatively compared to manned aircraft. For example, Dragon Eye is man-portable and uses sensors to accomplish its mission. While there are manned surveillance aircraft with more sophisticated sensors, portability allows this vehicle to provide urban surveillance and operate in a manner manned aircraft cannot; thus it can be considered transformational.

UCAV Attributes

The Navy, Defense Advanced Research Projects Agency, and contractors are designing UCAVs to meet performance specifications based on suppressing enemy air defenses, strike, and ISR missions. Regardless of mission-specific design traits, there are basic capabilities that all naval UCAVs should demonstrate to be operationally viable.

Maintainability and reliability. At a minimum, future vehicles must be readily maintainable and operationally reliable as contemporary manned aircraft. This ensures that they can be repaired and accomplish the missions they were designed to perform. A state-of-the-art unmanned vehicle benefits no one if it is inoperable the majority of the time due to maintenance issues.

Some argue that survivability must be an attribute. While desirable, the ability for UCAVs to survive battle

damage should be considered secondary, especially if they have a fractional cost compared to manned aircraft. Designing a vehicle to be highly survivable adds expense and weight; and weight reduces endurance. Also, incorporating inexpensive stealth technology into the design reduces the probability that enemy surface-to-air radar systems will detect vehicles, thus mitigating the need for survivability. Once the technology matures and costs are reduced, minimal combat survivability can be considered acceptable due to the throw-away cost.

Air traffic control standards. UCAVs must be able to operate within the same air traffic control standards as manned aircraft. For the Navy, this means carrier-based vehicles operating within the constraints of the normal operational launch and recovery cycle. Furthermore, carrier-based unmanned vehicles must be able to fly day and night landing patterns within the same timing and airspace requirements as their manned counterparts. Imposing different rules on UCAVs and manned aircraft reduces carrier operational effectiveness and efficiency. Whether or not an aircraft is manned should be transparent when operating within carrier controlled airspace.

Organic capability. Naval unmanned vehicles should remain organic to the battle group, which means taking off and landing on board ships. For example, if vehicles are tactically viable in the strike mission or suppressing enemy air defenses, operators who control vehicles must perform required strike planning alongside aircrews flying manned aircraft. All players must understand the mission timeline, aircraft flight routes, and airspace restrictions.

Some may argue that naval unmanned vehicles should operate from nearby foreign airfields when carriers are deployed in-theater. The advantage of land-basing vehicles would be removing the requirements for heavier carrier landing gear, thus increasing aircraft endurance. Nevertheless, land-basing would reduce combat effectiveness because mission planners would not be working alongside air wing strike planners to develop and understand the mission, contingencies, and last minute changes. It is not operationally viable for UCAV mission planners to stay on carriers when unmanned aircraft are based at nearby fields. A case in point is the war in Afghanistan, when Saudi Arabia stipulated that strike aircraft—as opposed to support aircraft such as tankers—could not operate from its airfields. The Navy cannot afford to have foreign governments dictate the use of naval aircraft during wartime operations.

Marines guiding Dragon Eye, Enduring Freedom.

1st Marine Division (Kenneth E. Madden)

Significant cost or performance advantage. Since the U.S. military is the premier fighting force in the world, deploying naval UCAVs runs the risk of decreasing combat effectiveness. Furthermore, substantial research and development costs are associated with designing future unmanned vehicles, and these funds could be used to build additional combat proven manned aircraft. Therefore, for the Navy and Marine Corps, future vehicles need to provide a significantly improved capability or advantage to offset the risks and costs associated with unmanned programs. Returning to what constitutes transformation, this necessitates that UCAVs demonstrate a twofold improvement over manned aircraft.

Multimission capability. Current manned naval aircraft routinely perform multiple missions during a single

sortie and are retaskable once airborne, which commanders have come to anticipate. Future UCAVs should demonstrate this same multimission capacity to provide decisionmakers with real-time options. Moreover, considering that naval vehicles are being designed for endurance up to 12 hours and that tactical priorities can quickly change during combat, unmanned aircraft need to provide mission flexibility. For example, marines might need a reconnaissance capability to detect armor. Once located, they could target it with onboard weapons, and after the enemy is engaged sensors onboard UCAVs could be used to assess bomb damage.

Secure information relay. Finally, UCAVs need a secure and reliable means to transmit tactical information to ground stations, ships, or other aircraft. Naval communication systems must be encrypted to prevent interception and exploitation. If nonencrypted signals are intercepted, enemies can determine whether their mobile assets are being targeted and in turn their forces to expedite movement to a safe area.

Relaying (bouncing) vehicle tactical transmissions is a strategic necessity. Since vehicles are being designed for an over-the-horizon capability, control stations and aircraft would soon reach a relative distance that precluded reception and transmission. However, incorporating the ability to use ground stations, ships, aircraft, or satellites to relay information between UCAVs and control stations would greatly increase the effective range of these vehicles.

Getting the Job Done

There are three ways to control unmanned aerial vehicles: by remote piloting, autonomously, and semiautonomously, each with relative advantages and disadvantages.

Manned systems. If unmanned vehicles are such a great innovation, one might ask why the skies over Afghanistan aren't teeming with them? Combat missions often must react to unforeseen circumstances. Critics doubt that computer-brained UCAVs can compete with pilots in taxing situations such as air-to-air combat, when it is necessary to assimilate information and act immediately. Manned aircraft will excel in performing complex multimissions with unplanned contingencies since aviators adapt to evolving situations. While computers can perform certain functions better than aviators, they do not demonstrate the ability to react to unplanned or unprogrammed contingencies.

Predator UAV landing, Desert Rescue VIII.

DOD (Steven M. Turner)

Notwithstanding their advantages, manned aircraft have disadvantages when compared to their unmanned counterparts. The former are more expensive to operate while one ground operator can monitor and control several unmanned vehicles simultaneously. In addition, in performing missions deep within enemy territory, aviators risk death or capture. Prisoners of war create political and operational concerns because it is necessary to avoid targeting sites where friendly personnel are being held. UCAVs can perform similar missions with only a material loss if shot down.

Remotely piloted systems. Predator unmanned vehicles that engaged targets in Afghanistan used a man-in-the-loop control—that is, they were remotely piloted. In such a system, the vehicle has a communications link with a control station and receives control inputs to dictate flight path and sensor operation. Imagery from sensors is transmitted to the control station, and the manned operator then locates, identifies, and decides when to engage targets. The advantage is that the system is relatively unsophisticated; technology to remotely pilot aircraft has existed for years. The ground station operator can decide and react to the situation and direct the next action for the vehicle. Significantly, the system includes a man-in-the-loop who is responsible for releasing live weapons. Rules of engagement follow a chain of command to determine if circumstances warrant an attack and collateral damage is a concern. This system supports the rules since accountability resides with decisionmakers. The disadvantage is that it depends on a constant communications link, which may be susceptible to jamming or interference. Moreover, a remotely piloted system requires dedicated personnel, which is costly and time consuming during lengthy missions.

Autonomous systems. On the other end of the spectrum is the autonomous control system, which uses an onboard computer to locate, identify, track, and expeditiously attack targets. A control station is only used to receive sensor imagery and aircraft flight information. The foremost advantage of an autonomous system is that it does not require a constant communications link with a control station, and therefore jamming or interference of the aircraft's communications link is not detrimental to the mission. Also, autonomous systems require minimal man-hour support and are thus less expensive to operate.

The disadvantage of the control system is that it has not been combat proven. Autonomous systems have been used for reconnaissance and surveillance, but none has performed in combat. That is due in part to the biggest challenge facing autonomous systems: accountability for making weapons release decisions. Even if technology advances to allow autonomous combat, operational commanders would likely oppose it because if school buses are misidentified as troop carriers, who would be held accountable—the software programmer, UCAV squadron commander, or leader who authorized unmanned aircraft? A purely autonomous system should not be used in combat because of this dilemma.

it may be possible to modify a land-based Predator for use with close air support and surveillance missions

Semiautonomous systems. While certain phases of UCAV missions are remotely piloted, others are under autonomous control, blending man-in-the-loop and autonomous operations. For instance, time-consuming tasks such as aircraft station keeping and searching for enemy targets are accomplished autonomously using onboard sensors and computers. Once potential targets are located, decisionmakers verify their identity and ensure conditions exist to release weapons. The advantage is that the most dynamic phase has a man-in-the-loop, increasing the likelihood of success while maintaining rules of engagement and minimizing the chance of misidentification and engagement of noncombatants. The disadvantages are that communications links are susceptible to jamming or interference and that a decisionmaking process involving several people increases the time required to authorize weapons release and engage targets.

Gazing into the Future

From the descriptions of naval UCAVs on the drawing board, it appears likely that these vehicles will incorporate long-range surveillance sensors, electronic surveillance equipment, and precision weapons. Since the Marine Corps has no program underway, it seems doubtful that they will get a dedicated vehicle in the near future; however, it may be possible to modify a land-based Predator for use with close air support and surveillance missions. A near-term plan is in place, but what will naval UCAVs look like in the future?

Minesweeping. While not specifically found on unmanned aircraft, the Defense Advanced Research Projects Agency has used a chemical sniffer to detect buried landmines. With similar technology, a swarm of miniature UCAVs could fly over amphibious landing areas or minefields to locate buried landmines. A single vehicle would lightly land next to the landmine. All of these vehicles would detect individual mines, and once the swarm had detected them all, they would detonate onboard incendiary devices in unison, destroying themselves and the mines. A signal to detonate would come from a single manned control station, precluding unintentional detonation and collateral damage.

Smart grenade. As the Marines employ Dragon Eye for reconnaissance and surveillance, small UCAVs will serve a tactical benefit in the field. Miniaturized variants of Dragon Eye could carry small incendiary devices. Forces on the ground could remotely pilot the aircraft while using onboard sensors to look for enemy troops or ground vehicles. Once a target is detected, a marine could pilot the aerial vehicle, then cause it to detonate. In its simplest form, this miniature aerial vehicle would be used like a grenade that can fly around corners and down passageways.

Air-to-air. The Air Force is considering putting an air-to-air version of the Stinger missile, originally designed as a handheld ground-to-air missile, on the Predator. UCAVs performing air-to-air missions are a logical next step. While personnel aboard command and control aircraft can determine if the hostile identification and rules of engagement are being met using beyond-visual-range criteria, air-to-air UCAVs could easily engage enemy aircraft with their own weapons system. The 24-hour patrols over New York and Washington after September 11 were ended because of reduced threat and expense. The Navy and Air Force flew more than 19,000 combat air patrols over American cities at a cost of $500 million. If the need to reinstate these combat air patrols arises again, air-to-air UCAVs could perform the mission at a substantially reduced cost and free aircrews for other missions.

Amphibious support. Current Navy UCAV plans only cover employment from carriers; however, future vehicles can be housed in artillery shells. Once fired, the vehicles could penetrate defended beachheads, then UCAVs would separate and begin powered flight. Imagery of enemy defenses could be relayed to ships or amphibious units. And when targets are detected, UCAVs would be remotely piloted to detonate on impact. Such vehicles must have a small, inexpensive, and durable design to survive being fired from a naval gun.

Through advancements in technology and increased funding, naval variants of unmanned combat air vehicles will soon be deployed to suppress enemy air defenses and conduct strike and other missions. Moreover, these vehicles promise to conduct some missions more effectively and less expensively than manned aircraft. A result could be fewer joint strike fighters in the near term. Some have even predicted that this fighter might be the last manned strike aircraft built.

As unmanned combat air vehicles become more autonomous, it can be expected that a man-in-the-loop system will be used to preclude misidentification of targets and loss of innocent lives. They must not be employed in combat simply because they are available, but rather because they offer significant advantages over manned aircraft. Since their future application is virtually limitless, unmanned combat air vehicles will help maintain the supremacy of the U.S. military. **JFQ**

An Israeli Military Innovation

UAVs

By RALPH SANDERS

It should not be surprising that Israel has become a leader in military innovation given the demands of national security. Among the technologies that it has advanced are unmanned aerial vehicles (UAVs). Even though other nations have conducted experiments with these vehicles, Israel developed and fielded them as battlefield systems. UAVs are non-rocket-propelled aircraft that fly within the atmosphere and do not require humans on board to operate them. With aerodynamic features that enable them to lift and carry lethal as well as nonlethal payloads, unmanned aerial vehicles perform missions such as reconnaissance, command and control, and deception. They are not intended to replace air crews but to augment them for certain missions.

UAVs are relatively simple and sturdy, taking off and landing conventionally under the control of rated pilots located on the ground. They are sometimes preprogrammed and range in design from modern aircraft to missiles. Israel and America have invested heavily in these vehicles because of their combat performance, versatility, and low cost; thus UAVs are entering a new phase in their development.

Certain advantages were sought by using these vehicles. Because of their relatively small population, Israelis have always been particularly sensitive to loss of life. The Merkava tank, for example, was designed with the engine in front to protect the crew. Likewise, UAVs avoid risks to airmen. Israel recalled the plight of its prisoners of war and the way their enemies exploited them

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for propaganda. Resource constraints also demanded optimum results from military innovations. Consequently, Israel sought the most efficient technologies. For the most part, and despite certain limitations, UAVs are becoming more economical, making them attractive to political and military leaders alike.

Given the fact that Israel has fought six wars and is engaged in counterterrorist operations of major proportions at present, its defense officials can employ UAVs across a range of missions. It should be stressed that these vehicles represent only one of several innovations developed to meet security challenges. Yet advocates are optimistic because of the advent of lightweight composite structures, reliable digital flight control systems, miniaturized sensors, and strong data links.

The Relevant History

During Operation Peace for Galilee in 1982, Israeli aircraft flew over the Bekaa Valley in the Syrian-occupied area of Lebanon to destroy surface-to-air (SAM) missile batteries. Earlier, UAVs had fingerprinted Syrian surface-to-surface radars by gathering their electronic frequencies. The Israelis then programmed the frequencies into antiradiation missiles. When the assault began, UAVs cruised the battlespace emitting dummy signals. Syrian radar operators thought that Israeli planes were attacking and launched most of their SAMs against unmanned vehicles. As the Syrians reloaded and were vulnerable to air attack, Israeli fighters struck with telling effect.

the Israeli military learned vital lessons regarding UAVs during the Yom Kippur War in 1973

In addition, Syrian radars that tracked UAVs alerted the Israelis to devices which emitted signals. With previously gleaned electronic signatures, Israeli aircraft with antiradiation missiles and supporting artillery fire destroyed the enemy missiles. Israel does not use unmanned vehicles in isolation. It fielded sophisticated jamming systems and precision bombs in 1982, which neutralized 19 enemy batteries. Free of SAMs, Israeli aircraft attacked Syrian aircraft. In what unfolded as the largest air battle since the Korean War, Israel claimed 22 kills without a single loss.

The Israeli military learned vital lessons regarding UAVs during the Yom Kippur War in 1973 and applied them smartly in 1982. In fact, in both Lebanon and Syria, Israel was among the first nations to employ such vehicles regularly for reconnaissance in combat, demonstrating that when used effectively they can help achieve combat objectives.

These vehicles played a significant role while Israel occupied a security zone in southern Lebanon. For example, a UAV squadron served before and during the Grapes of Wrath Operation to find concentrations of terrorists and the homes of their commanders. With forward-looking infrared radar cameras, unmanned aerial vehicles saw at night, removing darkness as a cover for Hizbollah fighters.

Defense Industrial Base

The emergence of unmanned vehicles resembles the early stage of developing computers in the United States. It began when an American, Alvin Ellis, decided that unmanned flight could have a military role. In 1967 he moved to Israel and joined Israel Aircraft Industries (IAI). After analyzing the Yom Kippur War, he found that a drone equipped with a television camera offered clear battlefield advantages. With an IAI colleague, Yehuda Manor, he built a prototype UAV in a garage, not unlike Steve Jobs and Stephen Wozniak, who assembled the first Apple computer.

After being rejected by IAI, the pair sought backing from a government-owned company. Ellis approached Tadiran, a private electronics conglomerate, which funded the project. Once the prototype was flown in 1973, Tadiran signed a contract to develop an operational model known as Mastiff, with a pusher-propeller twin-boom configuration, a feature that would become standard for combat surveillance. While this unmanned vehicle attracted little attention for some time, the Israeli military eventually became interested. Tadiran and IAI engaged in bitter competition for a defense contract to develop and produce the vehicle.

Soon the Israeli defense ministry was acquiring Mastiffs from Tadiran while IAI supplied its Scout model, which had a configuration similar to the Mastiff. With UAVs providing critical reconnaissance information on the Bekaa Valley, America took an interest in unmanned vehicles. Tadiran teamed with IAI and then submitted a proposal in 1984 for a model to meet U.S. military requirements. As a result, IAI formed a division known as Malat to produce UAVs.

IAI has become a leader in finding solutions for integrated UAV-related problems. It has a system for virtually every scenario from tactical to medium-altitude, long-endurance vehicles. The firm has focused on tailoring advances in payloads, data links, and mission control centers to meet customer needs.

Malat later consolidated production of Mastiffs and Scouts and continued to sell slightly different versions for over a decade. Both models have fixed landing gear and generally operate

Pioneer UAV, Paris Air Show.

PhotoLink (Michael Vines)

from runways, performing short landings with an arresting-wire hook. However, they can also be launched from a hydraulic catapult mounted on a truck and recovered by a net. The two models carry imaging sensors in a turret under the fuselage. The Mastiff and Scout remained in service until the early 1990s, when the Malat Searcher became the preferred UAV. Similar to the Scout but over twice its size, the Searcher has a more powerful engine, updated avionics and sensors, greater endurance, and improved survivability. First deployed in 1998, it can fly at 20,000 feet for 14 hours, carrying advanced video cameras for daylight and night observation.

In addition, Malat has explored a smaller UAV, Eye-View, which has fixed landing gear, pusher propeller, and a distinctive tail-boom on the rear fuselage. IAI is promoting Eye-View in civilian markets for detecting forest fires. Another firm, Silver Arrow, a collaborative project of Elbit and Federmann Enterprises, offers large UAVs and two smaller versions, including the Sniper and Micro-V. The former resembles a conventional private aircraft and has an unusual upright vee-shaped tail. The latter is too small to carry a full sensor turret but is equipped with a miniaturized imager in a transparent section within its fuselage.

IAI/Malat has delivered more than 600 UAVs to the Israel Defense Forces and customers overseas. Sales totaled some $200 million in 2001, and the firm held a workshop to advance civil and commercial applications of UAVs during the previous autumn. A private sector firm, Elisra, produces electronics systems for use in UAVs operating in hostile environments. In joint ventures undertaken with IAI, Elisra has proven a valuable partner.

Operational Dimensions

UAVs ease the tasks of commanders on the battlefield and have the potential to become force multipliers—that is, devices that improve effectiveness in combat without requiring more forces or that enable commanders to accomplish missions with fewer forces. In military operations, force multipliers relate to providing commanders with information to make timely decisions. They include battlespace surveillance radar, remotely piloted vehicles, and UAVs.

Yet the future role of unmanned vehicles triggers debate. Some experts suggest that they have a promising future with their potential to revolutionize conventional military operations by the end of the decade. On the other hand, the Center for Defense Information argues that these platforms will not greatly change warfighting. At present many commanders find them helpful, but they have brought only incremental improvement, enabling forces to do what they already do only more effectively. They do not yet give promise of revolutionizing the art of war.

Specifically, UAVs contribute in several ways. They can fly for extended periods without refueling. Moreover, they can loiter at length; the longer they hover over a target, the better the photographs. In addition they are economical to build and operate, though precautions are in order because the cost advantage can evaporate as acquisition bureaucracies inevitably attempt to develop larger, more complex, and more capable models. Third, if an unmanned vehicle is either downed or destroyed, as previously emphasized, no pilot is killed or captured.

Thus far, UAVs have been used chiefly for surveillance and reconnaissance. But lately they have been employed as weapons platforms to destroy selective targets. Unmanned vehicles are smaller, lighter, and less expensive than their manned counterparts. To take full advantage of these and similar innovations, the military must develop new operating concepts and change mindsets on how to fight wars in the future.

UAVs can loiter at length; the longer they hover, the better the photographs

Constraints on Israeli defense spending require a turn toward force multipliers. A growth in Palestinian violence has reversed a downward trend in the defense budget in recent years. The expenditure of $8.9 billion in 2001 has no doubt been increased. UAVs will help get more use out of existing military equipment.

Missile Defense

Five years ago the Israelis began promoting the Moab system, in which unmanned aerial vehicles counter ballistic missiles during their boost phase. This effort involved using UAVs armed with Python 4 air-to-air missiles. Planners argued that an ability to operate at high altitudes and loiter for days virtually immune from attack by either surface-to-air missiles or fighters made them especially useful for engaging theater ballistic missiles soon after launch.

Analysts found that high-altitude, long-endurance UAVs could complement terminal missile defense systems cost-effectively. They began developing the HA–10, a stealthy, long-endurance unmanned vehicle, but never built it, concluding that since American support for such a venture was unlikely, the required financing for the project would not be forthcoming.

One American defense official expressed the reluctance to support the project in the following words: "Targeting a fast-moving missile could be extremely difficult, especially if the UAV is going to see it and then catch it in the first minute or so of its flight." According to critics, communications among vehicles and command and control centers would not be fast enough to make launch decisions on time. The United States has concluded that using UAVs for boost-phase intercept may prove to be too great a technical and financial challenge.

Israel later used UAVs to destroy launch vehicles on the ground, specifically in hunting down Scud missiles. For its part, America has explored incorporating them into missile defense for warhead detection and monitoring. These vehicles may employ infrared sensor and data collection systems, hoping to track missiles during their midcourse flight.

The verdict on using UAVs for theater missile defense is still moot. In the meantime, the Israelis appear willing to pursue the matter, in the hope that additional research and development will someday provide the knowledge that will make them effective antiballistic missile weapons.

Counterterror Role

Terrorism gave prominence to unmanned aerial vehicles because of their reconnaissance, surveillance, and target acquisition capabilities. For example, since they can see at night, darkness no longer cloaks attacks by Hamas, Hizbollah, and other groups. In particular, the role of UAVs on the urban battlefield that terrorists prefer has become important. With aerial photography, these vehicles offer an effective way of finding snipers and generating street plans and relief maps of enemy positions. That information in turn can be relayed to commanders in real time. Unmanned vehicles have become a necessity before sending troops into a city.

Israeli success in employing UAVs prompted both U.S. military and intelligence agencies to use the same tactics. In November 2002, the CIA deployed a vehicle as a hunter-killer asset. It helped destroy a vehicle carrying al Qaeda operatives after they launched a Hellfire air-to-surface missile near the Yemeni capital. One of the men in the car had participated in the attack on *USS Cole* that killed 17 Americans.

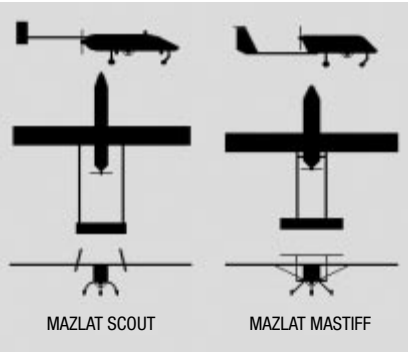
Unmanned vehicles were also used in Afghanistan as coalition forces pursued the Taliban and al Qaeda terrorists over mountainous terrain. But they have their limitations, as demonstrated by the failure to locate Osama bin Laden. As the Israelis learned, UAVs may identify an enemy, but the target often disappears by the time a helicopter or fighter aircraft arrives.

Capability and Limitations

Compared with high-performance aircraft, UAVs move more slowly over hostile territory to collect information, exposing them to enemy fire. Unmanned vehicles also lack the instinct of self-preservation that piloted aircraft possess when evading enemy defenses. Although the number of

vehicles which Israel lost over the Bekaa Valley in 1982 or during other operations is unknown, NATO lost 22 during the war in Yugoslavia. In addition, UAVs cannot use terrain for protection against hostile fire. Once damaged, they lack redundant onboard systems like other aircraft.

Unmanned vehicles have restricted data-link technology, which limits both their range and flexibility in activities such as terrain masking. Moreover, as operational experience grows and the vehicles become better known, new instruments will be designed to counter them. Israel is developing measures to correct such problems. When their signatures are reduced, UAVs are more difficult to locate. New multispectral sensors will enable them to operate in inclement weather. When the range of their sensors is increased, unmanned vehicles can remain at some distance from threats. Changing their flight profiles makes them less predictable as well as harder to hit. Finally, other innovations—including countermeasures which interfere with air defense guidance systems—will improve their overall UAV performance.


MAZLAT SCOUT MAZLAT MASTIFF

Foreign Military Sales

Israel must sell arms to other nations to subsidize its own defense industrial base. With the downturn in the global demand for military hardware, it must carefully select which products to market. UAVs are likely candidates for foreign military sale for a variety of reasons. They meet general security needs, performing missions such as counterterrorism, protection against theater ballistic missile attacks, and conventional warfare. They can be designed for a range of military roles, from overhead surveillance to launching lethal weaponry. Finally, they are not as costly as many other systems. Among the countries that have become Israeli customers are Chile, India, Singapore, and the United States.

America has long collaborated with Israel in defense matters. But because the Pentagon is reluctant to buy weapons from overseas, foreign manufacturers normally team with U.S. firms. For example, AAI Corporation is making the Israeli-designed Pioneer UAV for both the Army and Navy. IAI has assisted TRW Avionics and Surveillance Group to produce the Hunter UAV, which was originally developed by IAI. Since this cooperation began, Malat has developed more advanced battlefield UAVs in collaboration with U.S. partners.

The Marine Corps has also been testing Israeli UAV prototypes. It is especially looking into their potential for urban warfare. IAI has recently teamed with Raytheon Missile Systems to promote a combat unmanned target locate and strike system called Cutlass.

Both India and Israel face hostile neighbors. As India confronts Pakistan over Kashmir, Israel has become one of its major weapons suppliers. A report in *Asia Times* suggests that India is Israel's second largest defense customer. In fact, an article published in *Iansa*, an Indian journal of strategic studies, claimed that Israel may replace Russia as the principal source of military hardware. Whatever the validity of these reports, Tel Aviv is becoming a major arms dealer in New Delhi. Washington is concerned that such sales can have an adverse effect on the region. Consequently, the United States asked Israel to downplay these transfers.

After India opened its mission in Israel, a delegation from Malat visited India to discuss the sale of military technology. A short time later, Israel offered to sell third-generation Searcher long-endurance multi-role UAVs to India as well as multipurpose tactical unmanned vehicles. The Searcher can remain airborne for 16 hours and has a range of 159 kilometers, which makes it suitable for operations in the Himalayas.

After being caught offguard by incursions in the Kargil region of Kashmir, India decided to buy unmanned vehicles from Israel. Specifically, New Delhi wanted to stop infiltration along the line of control and reportedly acquired 100 UAVs for $750 million, a deal that some indicate could be doubled. In late 2000, the Indian army deployed its first group of 25 Searcher Mark IIs on its frontier with Pakistan and China. It may also order more expensive Searcher IIs, which are capable of operating at 15,000 feet.

Many militaries around the world have become enthusiastic over unmanned vehicles. They have seen the Israelis develop UAVs to meet their security requirements from missile defense and conventional operations to counterterrorism. These vehicles enable commanders to see more of the battlespace, and knowing an enemy goes a long way toward defeating it. Moreover, no one can be killed or injured flying them. As enemies become familiar with the strengths and limitations of these vehicles, they will find the means to reduce their effectiveness in some environments. Yet Israel is convinced that such systems improve military capabilities at a modest cost. Unmanned aerial vehicles will certainly continue as a major export item for its defense industries. JFQ

NDU international fellows on class trip.

National Defense University

Educating Foreign Officers

By DOUGLAS M. GIBLER *and* TOMISLAV Z. RUBY

An editorial published in a British newspaper in 2001 lamented the fact that the School of the Americas at Fort Benning had trained a string of military dictators in recent decades: Roberto Viola and Leopoldo Galtieri of Argentina, Manuel Noriega and Omar Torrijos of Panama, Juan Velasco Alvarado of Peru, and Guillermo Rodriguez of Ecuador—as well as the leaders of death squads in Peru and Honduras, among other notorious graduates.[1] And other programs operated by the Armed Forces have been cited for training Indonesians prior to the repression in East Timor as well as future Taliban leaders during Afghan resistance to Soviet occupation.

However, such cases are unrepresentative of the international military education programs conducted by the United States. Far more characteristic is the example of the war college graduate from Central Europe who went on to an assignment at NATO headquarters or another from the Middle East who returned home to educate fellow officers. Professional military education (PME) acts as a stabilizing factor that provides officers from many nations with the opportunity for study and exposure to the democratic values while attending senior- and intermediate-level institutions in America.

Terra Aliena

Half a million foreign officers have attended programs in the United States—nine thousand from over a hundred countries in 2000—and of that number, some two hundred annually attend year-long courses with their American counterparts at PME institutions.

Professional military education differs from specialty training, which defines career fields for officers. Each service operates both a senior and

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THE SCHOOLHOUSES

Each service operates professional military education institutions on the senior (war college) and intermediate (staff college) levels. In addition, the National Defense University administers three colleges under the authority of the Chairman of the Joint Chiefs of Staff.

The U.S. Army War College at Carlisle Barracks, Pennsylvania, was founded in 1901 and has graduated more than 700 international fellows from almost 100 nations since 1978. On the intermediate level, more than 6,000 officers from over 140 countries have attended the U.S. Army Command and General Staff College at Fort Leavenworth, Kansas, since the early 1900s. With some 90 students representing 75 countries per class, the college lists 23 alumni who have become heads of state in their respective countries.

The Naval War College was established at Newport, Rhode Island, in 1884. It operates two institutions for international officers, the Naval Command College and the Naval Staff College. The Naval Command College was organized in 1956 and parallels the College of Naval Warfare, which educates U.S. students. It has graduated more than 1,500 senior officers from almost 90 nations—over half of whom have reached flag rank and approximately one in ten have become chiefs of their navies. The Naval Staff College was established in 1973 and has graduated over 1,400 mid-level officers from some 120 nations. This institution is being integrated into the College of Naval Command and Staff, which is attended by U.S. students.

On the senior and intermediate levels, the Marine Corps War College and the Marine Corps Command and Staff College, are constituent institutions of the Marine Corps University, which is located at Quantico Marine Base, Virginia. Some two dozen international students are enrolled each year in the latter institution.

The Air War College and the Air Command and Staff College were both organized in 1946 and are administered by Air University at Maxwell Air Force Base, Alabama. The former college is attended by foreign students from 45 nations and the latter enrolls some 80 officers from abroad.

The National Defense University was established in 1976 and is comprised of two senior-level institutions, the Industrial College of the Armed Forces and the National War College, which are located at Fort Lesley J. McNair in Washington. Approximately 36 international fellows attend these two colleges each year. The Industrial College of the Armed Forces is the successor to the Army Industrial College, which was organized in 1924; the National War College was founded in 1946.

The Joint Forces Staff College (formerly the Armed Forces Staff College) was incorporated into the National Defense University in 1981 and is located in Norfolk, Virginia. It enrolls approximately 50 foreign students each year in courses on joint planning and warfighting on the operational level, and traces its lineage to the Army-Navy Staff College, which was created during World War II. JFQ

an intermediate-level PME institution (or war and staff college). In addition, the National Defense University administers the Industrial College of the Armed Forces and the National War College on the senior level as well as the Joint Forces Staff College, which are joint institutions operating under the auspices of the Chairman (see the accompanying insert, "The Schoolhouses").

In general, war college programs primarily focus on national military and national security strategy while staff college programs are devoted to theater-level operational art. The Chairman is required to ensure that curricula are current, standardized, and compliant with Goldwater-Nichols. Many countries send officers to the United States on a reimbursable basis under the Foreign Military Sales program, much as they purchase equipment. Developing nations that cannot afford the cost of education are provided with military assistance by the Department of State under the International Military Education and Training (IMET) program.

Phrases such as supporting security assistance, international involvement, lasting relations, and the like are common in descriptions of these programs. Educating international officers develops channels of communication with other nations and promotes democratic ideals around the world. Resident programs build familiarity with American officers to forge lasting friendships and an affinity for democratic values.

Emerging Democracies

The road to democracy is prone to violence. Embattled elites may attempt to manipulate nationalistic tendencies and create an alternative to mass democracy movements. These elites are easier to coordinate, often have better political access, and are better able to use the weak institutions of emerging democracies to their advantage. Rising nationalism then turns to a fait accompli that sends a state to war. The elites favor war because during wartime democratic rule can be dispensed with in favor of authoritarian measures. As one analysis pointed out, most great powers have been belligerent during democratic transitions because of this elite competition.[2]

Although war may be more likely in transitioning states, the probability of conflict is quite small even when there may be elite competition. Absent a divisionary war, strong elite interests often use the military to displace a transitioning

Senior Malaysian officer, Fort Stewart.

Fort Stewart (Michael Lemke)

regime. A more elite-friendly regime then appeals to authoritarian means to quell mass democratic movements. This is why coups are more likely in periods of transition, and it is not a coincidence that most originate in military mutinies. Elites can ensure that democratic transition does not happen by capturing the military.

Fear of military intervention in politics may prompt some governments to educate soldiers. By emphasizing technical expertise, professional military education can break down the corporate identity and parochialism of armed forces. Professionalism can isolate officers from undue interest in the civil sector. As one researcher argues, this is one of many strategies that repressive regimes adopt to ensure their power.[3]

professional military education can break down the corporate identity and parochialism of armed forces

But coup-proofing need not be limited to authoritarian governments; it can benefit at-risk regimes, and often the least stable regimes are undergoing or have recently completed transitions to democracy. The political tensions experienced in such regimes, and the susceptibility of their militaries to elitism, makes professionalization and democratization of the military essential tools in the liberalization of their political systems.

In addition to the primary focus of their curricula, PME institutions offer another level of expertise. The emphasis on civilian control of the military, democratic decisionmaking, and social responsibility in the officer corps provides valuable lessons. For many foreign officers, this educational opportunity is their first exposure to graduate-level study, making PME an important path toward developing truly professional militaries for their countries.

Study at an intermediate or senior college also exposes foreign officers to American society. They do not simply live abroad for a year; many are accompanied by family, and their children go to local schools and spouses attend culture classes. They learn about their U.S. counterparts through intramural sports and social events. In fact, as one study reveals, "Of all the experiences foreign military students remember, contact with the American culture stands out. . . . Curiosity about the United States and how free market democracy functions today is greater than ever."[4]

Alumni of the National Defense University include several foreign officers who assumed critical roles in political change. Pro-democracy graduates overthrew a 23-year-old dictatorship in Mali and rallied pro-democracy demonstrators in Thailand, while others put down attempted coups in Venezuela. But education alone will not stabilize the situation in each case. For example, some graduates were forcibly retired in Yugoslavia, removing officers who might oppose undemocratic practices. The issue then becomes whether the educational experience can overcome illegitimate regime change in transitioning countries.

Because test cases can be anomalies rather than representing trends, Argentina, Greece, and Taiwan provide insights on the influence of professional military education. Despite differences

in history, culture, and national policies, all three nations have experienced a democratic transition since 1970, been an ally or friend, and sent officers to study at institutions in America.

Although some observers identify foreign military programs with would-be dictators, this is not the experience of PME institutions. Based on a survey of students between 1950 and 1999, only two officers were charged with any form of malfeasance out of 114 Argentines, 203 Greeks, and 331 Taiwanese educated in the United States. Both were charged with abuses in Argentina. However, neither of them led a coup or junta. This amounts to only 4 percent—two out of more than fifty graduates prior to 1983—and was far below the estimated number of Argentine officers (20 percent) who took part in the so-called dirty war.

like the experience of Argentina, democratization came to Greece only after the failure of a military regime

Argentina

In the wake of the Falklands/Malvinas War, the Argentine military underwent a profound change that included massive demobilization, budgetary cuts, a volunteer force, and professional military education similar to the U.S. model. The armed forces had traditionally guarded the type of education officers received by managing curricula and exposure to civil virtues. This level of control ensured domestic autonomy for the military, but it also contributed to the debacle at the hands of the more advanced professional force.

Realizing the need for professionalism, the military encouraged officers to attend university either at home or abroad. High-ranking officers were selected for programs in the United States at a rate of about five per year beginning in 1988, and every Argentine officer had earned a college degree of some kind by 1997. The American influence became apparent in 1991 when Argentina established a new command staff college that has become one of the most renowned educational institutions in the country. The curriculum is explicitly based on the U.S. model, emphasizing respect for and subordination to the constitution and the law.

Professionalization has been guided by education. Argentina has experienced several major shocks in response to financial crises in recent years—upheavals that once would have led to coups and countercoups—but the military stayed in the barracks. As the Army Chief of Staff, General Ricardo Brinzoni, stated: "The Argentine army has given sufficient proof during the past 18 years about our steady assimilation into a democratic society."[5]

Hellenic Republic

Like the experience of Argentina, democratization came to Greece only after the failure of a military regime. Seizing power in 1969, the armed forces organized a junta that became more authoritarian as economic conditions worsened. Some 150 officers were purged through forced retirement and dishonorable discharges. Two of the highest ranking officers had been graduated from institutions in the United States. Threatened by a Turkish invasion during the Cyprus crisis of 1973, the junta transferred power to civilian authority. Elections followed and Greece became fully democratic by 1975. American graduates returned to service and rose to the highest ranks in the Hellenic armed forces.

The disgrace of the junta helped maintain civilian authority, but the threat of coups took longer to extinguish. One observer noted that "the overwhelming majority of both retired pro- and anti-junta officers interviewed" agreed that military intervention might have been necessary if the external threat increased or if domestic politicians made "terrible mistakes," which helps explain why coup attempts continued until the mid-1980s.[6] The attitudinal change for the Greek military finally came with the restructuring of its PME system.

In 1983 a Socialist government began a reform of the military academies. Admission was integrated with nationalized university exams, and background investigations were discontinued. Curricula were modeled on the U.S. professional military education system to inculcate democratic values. As a result, attendance was more than doubled and changes in selection criteria ensured that senior officers went to American schools. These developments combined to guarantee that liberal education dominated the academies and effectively altered the mindset of the officer corps.

Republic of China

Before the revision of sedition laws on Taiwan, the armed forces dominated a vital aspect of civilian life. The military was responsible for conducting trials of accused spies. The number of trials and political prisoners, combined with authoritarian rule, suggested that the armed forces were agents of the ruling elite, but the conduct of the military courts pointed to something else. Although government political trials were secret, military trials were open. Defense lawyers had time to prepare their cases and the transcripts of court proceedings were published. While those

AP/Wide World Photo (Alik Keplicz)

The Chairman with Polish army chief.

practices do not guarantee fair trials, they are not characteristic of kangaroo courts.

As one of the largest beneficiaries of professional military education with 331 graduates, Taiwan was able to democratize without a coup. These officers greatly influenced military courts and have been called upon to redress corruption in the armed forces. In 1985, a crime investigation led investigators to believe that the ring included military officers, and several senior members of the Military Intelligence Bureau were arrested and tried for murder. Although none had attended U.S. institutions, graduates were placed in command positions during the ensuing reorganization of the intelligence hierarchy. They were tasked with cleaning up the bureau. The role that graduates have played within the armed forces, and the removal of the military from political competition, suggests that professional military education is working on Taiwan.

The experiences of Argentina, Greece, and Taiwan bear witness to the benefits of the U.S. professional military education system. In addition, research supports this finding across all nations: the likelihood of coup attempts drops by more than half with the involvement of graduates, despite the strength of alliances, Cold War mindsets, and changes in wealth. The evidence of education as a stabilizing force is convincing.

Prior to World War II, *Ecole Superieure de Guerre* in France offered an elite experience for officers from many nations. It graduated professional, better-educated students who tended to become Francophiles after their year-long course. Today, the U.S. professional military education system is the standard by which other countries educate officers.

The United States has encouraged a greater number of officers from abroad to attend PME institutions as part of the global war on terrorism. The FY03 budget has projected a 27.5 percent growth in IMET funds over FY01 as well as a similar increase in the number of students. However, the traditional emphasis of professional military education institutions on democratic values should not be subsumed to the challenge of countering terrorism. **JFQ**

NOTES

[1] George Monbiot, "Backyard Terrorism," *The Guardian* (London), October 30, 2001.

[2] Edward D. Mansfield and Jack S. Snyder, "Democratization and the Danger of War," *International Security,* vol. 20, no. 4 (Spring 1995), pp. 5–38.

[3] James T. Quinlivan, "Coup-Proofing: Its Practices and Consequences in the Middle East," *International Security*, vol. 24, no. 2 (Fall 1999), pp. 152–53.

[4] John A. Cope, "International Military Education and Training: An Assessment," McNair Paper 44 (Washington: National Defense University Press, October 1995), chapter 8.

[5] Jose C. D'Odorico, "Chief to Chief," *Armed Forces Journal International*, vol. 138, no. 10 (May 2001), p. 62.

[6] Neovi Karakatsanis, "Do Attitudes Matter? The Military and Democratic Consolidation in Greece," *Armed Forces and Society*, vol. 24, no. 2 (Winter 1997), pp. 289–313.

General Creighton Williams Abrams, Jr.

(1914–74)

Chief of Staff, U.S. Army

VITA

Born in Springfield, Massachusetts; graduated from U.S. Military Academy (1936) and assigned to 1st Cavalry Division (1936–40); company commander, 1st Armored Division (1941–42); battalion commander, 37th Armored Regiment (1942–43); commanded 37th Tank Battalion and Combat Command B, 4th Armored Division (1943–45); served on Army General Staff and with war plans section, Army Ground Forces (1945–46); director of tactics, Armored School (1946–48); attended U.S. Army Command and General Staff College (1948–49); commanded 63d Tank Battalion, 1st Infantry Division (1949–51); commanded 2d Armored Cavalry (1951–52); attended U.S. Army War College (1952–53); served successively as chief of staff for I, X, and IX Corps, U.S. Army Forces, Far East (1953–54); chief of staff, Armor Center (1954–56); deputy assistant chief of staff for Reserve components (1956–59); assistant division commander, 3d Armored Division (1959–60); deputy chief of staff for military operations, U.S. Army, Europe (1960); commanded 3d Armored Division (1960–62); assistant deputy chief of staff and director of operations, Office of the Deputy Chief of Staff for Operations (1962–63); assistant chief of staff for force development (1963); commanded V Corps (1963–64); acting Vice Chief of Staff and Vice Chief of Staff of U.S. Army (1964–67); Deputy Commander and then Commander, U.S. Military Assistance Command, Vietnam (1967–72); Chief of Staff of U.S. Army (1972–74); died in Washington.

U.S. Army Center of Military History

Portrait by Herbert Elmer Abrams

Abrams spent considerable time in Germany, where he developed his appreciation for classical music with which he relaxed after busy days. His clenched cigar (of good quality), determined scowl, and occasional outbursts of profane rage over some malfeasance gave the image of a tough, fighting tanker—which he liked to project. Beneath this surface, however, was a man highly sensitive to subtleties, particularly able to relate to and respect allies of different backgrounds, and always willing to take a secondary position . . . if it in some way could advance the cause his country was supporting. In short, he was more the Eisenhower than the MacArthur or the Patton.

—William Colby, *Lost Victory* (1989)

Doctrine

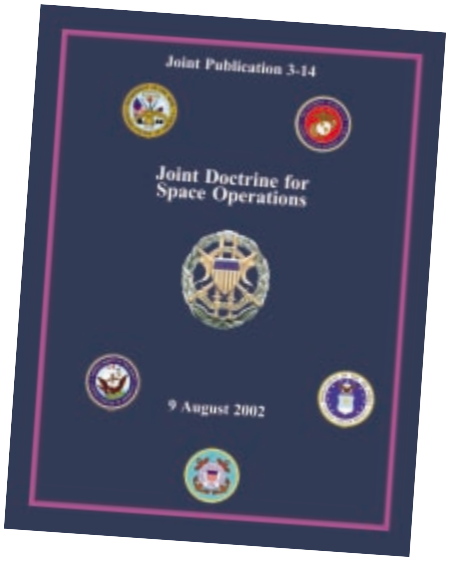
CONTROLLING THE HIGH GROUND

Although Joint Pub 3-14, *Joint Doctrine for Space Operations*, became outdated only 52 days after its issuance with the deactivation of U.S. Space Command and the assumption of space responsibilities by U.S. Strategic Command in October 2002, it is a valuable reference for military professionals who seek to understand the impact of space capabilities on joint warfare. In particular, the volume covers military space operations, organizations and missions, command and control of forces, and considerations for deliberate and crisis action planning.

The first chapter summarizes military operations and three interrelated ideas: that space is a *significant force multiplier*, that the United States is *increasingly dependent* on space capabilities, and that this dependence results in a *potential vulnerability*. The next chapter looks at organization, missions, duties, and responsibilities for military space. In addition to the out-of-date discussion of U.S. Space Command, service competency has also changed and is not as clear cut as in the past. Components are listed in the current version of *Forces for Unified Commands*, but only an interim set is identified. Resolution of a more enduring set of components is pending. The organizational description under the rubric of theater support remains largely correct and provides an indication of who's who in space support.

The discussion in chapter three of the command and control of space forces would almost be correct if the references to U.S. Space Command were credited to U.S. Strategic Command. Unfortunately, that replacement would still not be completely accurate because the components that served the former command are not components of the latter.

The strength of Joint Pub 3-14 is its discussion of both space and the principles of war and space mission areas. Joint warfighters must understand the relationships between space



capabilities and the principles of objective, offensive, mass, economy of force, maneuver, unity of command, security, surprise, and simplicity. The volume presents a concise review of the four space mission areas: space control, force enhancement, space support, and force application. It articulates space control missions—surveillance, protection, prevention, and negation—and provides descriptors for the escalating five Ds of negation: deception, disruption, denial, degradation, and destruction.

The publication also offers a tutorial on how space can enhance joint force effectiveness by supporting intelligence, surveillance, and reconnaissance and integrated tactical warning and attack assessment such as missile defense and nuclear detonation detection, environmental monitoring, and the benefits of global positioning, including further information on these areas in appendices.

The last chapter provides a look at space planning. Specifically, it describes the integration of space forces and capabilities into deliberate planning, crisis action planning, and possible flexible deterrent options.

Current plans to revise Joint Pub 3-14 call for consolidating it with the as yet unpublished Joint Pub 3-14.1 on space control. This revision is slated to begin in April 2004 with an updated version of Joint Pub 3-14 to be issued in April 2006. **JFQ**

WAR AND THE HUMAN PSYCHE

A Review Essay by
IAN ROXBOROUGH

On Killing: the Psychological Cost of Learning to Kill in War and Society
By Dave Grossman
Boston: Little, Brown and Company, 1995.
366 pp. $14.95
[ISBN: 0–316–33011–6]

A War of Nerves: Soldiers and Psychiatrists in the Twentieth Century
by Ben Shephard
Cambridge: Harvard University Press, 2001.
487 pp. $27.95
[ISBN: 0–674–00592–9]

An Intimate History of Killing: Face-to-Face Killing in Twentieth-Century Warfare
by Joanna Bourke
New York: Basic Books, 1999.
509 pp. $30.00
[ISBN: 0–465–00737–6]

War is a realm of exhaustion, horror, and at times madness. The three books reviewed here attempt to come to grips with what might be called the psychic dimension of combat: why men kill and what happens to their minds in the process.

On Killing: The Psychological Cost of Learning to Kill in War and Society begins with the well-established belief that "man is not by nature a killer." The author, Dave Grossman, quotes the claim by S.L.A. Marshall that fewer than 20 percent of the soldiers who fought in World War II shot at the enemy. Some fired consistently, but others failed to either aim their weapons or pull the trigger, demonstrating a human inhibition against killing.

These findings by Marshall, though subject to dispute, were taken to heart. Since the war, Western militaries have undertaken a training revolution consisting largely of techniques to enable greater numbers of soldiers to fight more effectively. When people become angry or frightened, they stop thinking with their forebrains—which distinguishes them from animals—and start to rely on their midbrains. "They are literally scared out of their wits." Using pop-up targets and other training devices, Western armies conditioned soldiers to shoot reflexively. By the Vietnam War, the percentage of combat troops who fired their weapons had risen to 95 percent. In this way, using modern psychology techniques, the reluctance to kill had been reduced.

Reducing nonshooters has not taken the terror and stress from the battlefield. In American wars of the 20th century, the chance of becoming a psychiatric casualty was greater than being killed by enemy fire. The sustained tempo of military operations gives the stressed soldier little respite. Grossman concludes that "our physical and logistical capability to sustain combat has completely outstripped our psychological capacity to endure it." The result is that combat can literally cause madness in the ranks. "Fear, combined with exhaustion, hate, horror, and the irreconcilable task of balancing these with the need to kill, eventually drives the soldier so deep into a mire of guilt and horror that he tips over the brink into that region that we call insanity."

Ben Shephard examines those who study and treat the mind in *A War of Nerves: Soldiers and Psychiatrists in the Twentieth Century*. It is a history of the diagnosis and care of the traumas associated with battle. The author recounts the story of psychiatry as it became an accepted scientific discipline. He details the divisions between soldiers and psychiatrists over treating mental disorders brought about by combat.

The military was forced to deal with mental problems to stem the loss of fighting men while civilian authorities were concerned with reducing the cost of psychiatric disabilities, which indeed were immense. In the battle of the Somme in 1916, as many of 40 percent of the casualties were caused by shell shock. At the end of the war, 11,600 British servicemen were committed to mental asylums. Some 40,000 Britons were receiving pensions for war-related mental disorders as late as 1939. The United States spent almost a billion dollars on the psychiatric illness of veterans in the interwar years. The pressure to understand madness in war and develop treatments was enormous. Both psychologists and psychiatrists, with their military sponsors, gradually learnt more about the mind under the stress of battle. Eventually, instead of evacuating psychiatric cases to hospitals at home, methods of rapidly treating men and returning them to the front evolved, though not without controversy and experimentation. This has been effective. Today most soldiers are immediately treated in the combat zone and sent back to fight after a few days rest.

But the increased ability to kill comes with the cost of increased post-traumatic stress as combat veterans seek

Gettysburg, July 1863.

War Department (Timothy O'Sullivan)

Ian Roxborough holds dual appointments in history and sociology at the State University of New York at Stony Brook.

to deal with guilt. Researchers still know little about the long-term impact of killing and the reintegration of veterans into society. Moreover, the study of psychiatric casualties is bedeviled by inadequate and contradictory statistics. Estimates of the number of Vietnam veterans suffering from post-traumatic stress disorder range from half a million to three times that number—or between 18 and 54 percent of those who served.

An Intimate History of Killing: Face to Face Killing in Twentieth-Century Warfare by Joanna Bourke tackles many of the same issues, but in a different spirit and with a quite different approach. The author reacts to what she perceives as sanitizing and wants to "put killing back into military history," stating that "the characteristic act of men at war is not dying, it is killing." In this regard, Bourke is at one with both Grossman and Shephard. But although the latter authors regard the act of killing as traumatic, Bourke argues that men get pleasure from taking life in war. Drawing on a wealth of published sources to support this contention, she believes that many or most servicemen were "intoxicated by 'violence for its own sake': fighting was fun." The personalization of the enemy enabled them to kill. "It validated combatants as moral men."

Bourke argues that soldiers make moral sense out of butchery through stories, which place them at the center of the narrative as willful, moral agents. To do this, they must adopt a positive attitude toward killing. To overcome the horror of war and retain a sense of themselves as moral beings, they come to glory in war. Eventually, soldiers derive pleasure from it.

This assertion may not seem plausible to many readers. Nor is the evidence that Bourke presents convincing. Regrettably, she is vague on the hypothesis she seeks to prove: is it that all men enjoy killing, that most men enjoy killing, or simply that some men enjoy killing? If her point is that under certain circumstances some men derive pleasure from killing, then she is right. (As Grossman reminds us, about 2 percent of the male population, when pushed or given a legitimate reason, will kill without remorse.) But if Bourke is claiming something more, her technique of rehearsing quotations from fictional and biographical accounts—without any attempt to determine whether they are representative—is simply not compelling. **JFQ**

GREAT POWER STRUGGLES

A Book Review by
GEORGE C. HERRING

The Tragedy of Great Power Politics
by John J. Mearsheimer
New York: W.W. Norton and Company, 2001.
576 pp. $27.95
[ISBN: 0–393–02025–8]

The events of 9/11 jolted Americans out of the triumphalism, insularity, and complacency that marked the post-Cold War era like nothing else. *The Tragedy of Great Power Politics* by John Mearsheimer was written before those attacks but claims that the hopes of the 1990s were illusory anyway. The author, who teaches political science at the University of Chicago, rejects the idea that the end of the Cold War and rise of democratic capitalism led to the end of history, an era in which states would play a less critical role and conflict would disappear. An unabashed realist, he insists that nations will continue to compete and great power conflict will be the norm.

Mearsheimer depends on history to buttress a theory of offensive realism. Displaying a mastery of the historical literature, he analyzes the patterns and records of great power conflict over the last two centuries to explain the behavior of nations and their reasons for going to war. He concludes that the international system is basically anarchic and that states thus seek wealth and power to gain preeminence in their regions, the most certain way of advancing their security. Other nations, faced with a regional hegemon, will seek to balance that power and encourage other nations to do so by passing the buck or acquiescing.

War often results from the structure of the international system. It occurs when power is dispersed among states in unbalanced multipolarity. Conflict is least likely when bipolarity or a rough balance exists between two powers, as characterized by the Cold War.

Even in the nuclear age, armies remain critical means of expansion and vital instruments of national power, an argument that naval and airpower enthusiasts may well dispute. Moreover, America has traditionally regarded itself as standing apart from Europe, and realists (including George Kennan and Hans Morgenthau) scorned idealism and utopianism. Yet Mearsheimer regards the Nation as an exemplar of offensive realism. The United States has sought regional hegemony since its was founded and is the only nation to achieve that elusive goal in modern times. Concerned over Japan, Germany, and the Soviet Union as threats to the international order, America became an offshore balancer, intervening in conflicts in key strategic regions of the world.

Mearsheimer insists that the real world remains a realist world. The international system is anarchic, and power politics will continue to drive great powers. He predicts that new benign power structures in Europe and Northeast Asia cannot be sustained, and the result may be unbalanced multipolarity. According to *The Tragedy of Great Power Politics*, the foremost threat is Beijing. If its economy grows at the same rate as the last two decades, China could exceed Japan and rival the United States. It has the potential to become a regional hegemon and pose a greater threat than during the last century. The prescriptions that Mearsheimer offers for the future are keeping U.S. troops in Europe and Northeast Asia, and in particular responding to setbacks in the Chinese economy. Above all, the Nation must not abandon the realism that has served it so well over the course of its history.

Readers may find much to quarrel with here. By focusing on European great powers and the United States and Japan, Mearsheimer leaves out much of the world, including the regions of preeminent concern at the moment. Indeed, a work on great powers seems strangely out of place as those states seek to cooperate in waging war against terrorism across international boundaries. Moreover, he plays down to the point of exclusion the role of personality, ideology, and to some degree economics in international conflict. Some will challenge the simplistic claim that America intervened in 1917 to uphold the European balance of power. And liberals who dream of a better world will object to his deep pessimism and predictions.

The Tragedy of Great Power Politics sets out a provocative thesis which is underpinned by powerful arguments. Written in a clear, forceful style, devoid of jargon and obscure language, it will be widely read and seriously debated. **JFQ**

George C. Herring is professor of history at the University of Kentucky.

THE CHIEFS AS POLICYMAKERS

A Book Review by
SAMUEL J. NEWLAND

Allies and Adversaries: The Joint Chiefs of Staff, the Grand Alliance, and U.S. Strategy in World War II
by Mark A. Stoler
Chapel Hill, North Carolina: The University of North Carolina Press, 2000.
379 pp. $37.50
[ISBN: 0–8078–2557–3]

The last decade has been a busy period for military historians. Since the 50th anniversary of World War II, there have been myriad publications on different aspects of the conflict. Some are scholarly works while others are memoirs by a dwindling generation of veterans. Within this new body of literature is an intriguing new book by Mark Stoler, *Allies and Adversaries: The Joint Chiefs of Staff, the Grand Alliance, and U.S. Strategy in World War II*. A professor of history at the University of Vermont, the author offers an excellent read for students of history and national security affairs. The book is a significant analysis of the emergence of America as a global power and the entry of the Armed Forces into the realm of policymaking.

The thesis of *Allies and Adversaries* is that change in civil-military relations arose during World War II. Routine military involvement in policy was minimal prior to that conflict. Other than a brief foray into world politics at the end of World War I, the focus of the Armed Forces before 1939 was on defense of the homeland, overseas possessions, and the Western hemisphere. During and immediately after the war, however, the role of the military expanded dramatically. By the time the National Security Act of 1947 was passed, the Joint Chiefs of Staff had entered the policymaking arena.

As World War II progressed, it became obvious that the conflict was global. Projecting power incurred substantial foreign policy implications. The scope of warfare involved the military in formulating international security policy.

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Combined Chiefs in Cairo, December 1943.

U.S. Army

According to Stoler, this had been an interest of the Armed Forces for a long time. Once America entered the war, two additional factors favored increased military participation. First, as Secretary of State, Cordell Hull maintained an artificial distinction between military and political affairs. Thus as the war progressed, the military had a primary role in policy development with diplomats in the background. Hull, the author claims, focused on postwar policy. Secondly, President Franklin Roosevelt relished running his own foreign policy, which also made the Department of State a secondary player.

Roosevelt was instrumental to the military entrance into the foreign policy arena because of his reliance on the Joint Chiefs of Staff. Although it had no statutory charter or mandated roles, Stoler notes the close relationship between the President and these officers. This affiliation increased the influence of the Armed Forces on foreign policy. But the new power of the Joint Chiefs came at the expense of the Secretaries of War and the Navy, and particularly the Secretary of State.

This was a difficult period in terms of policy, not only for the Axis but also the Allies. There was friction with Britain over various issues, including Churchill's fixation on Greece as the route to the European heartland. The greatest discord was with Moscow, which evolved from ally into adversary. Military planners increasingly worried about Soviet intentions in 1944, yet they felt it necessary to maintain good relations since the Soviets were needed first to help defeat Germany, then to aid in the downfall of Japan.

The Joint Chiefs concluded that conflict with the Soviet Union was inevitable. The role of the Red army in the occupation of Europe and the desire of the President to include the Kremlin in the postwar equation promoted cordial relations despite misgivings. Concerns were validated when the Soviets violated the Yalta agreement almost before the ink was dry.

By the end of the conflict the military was entrenched in foreign policy formulation. This role starkly contrasted to the pre-war years. The development of the Joint Chiefs during the war and its evolution into a politico-military entity is intriguing. Stoler helps explain how this came to pass. This excellent book is highly recommended. **JFQ**

SOLDIERS AS GOVERNORS

A Book Review by
AUDREY KURTH CRONIN

Waltzing into the Cold War: The Struggle for Occupied Austria
by James Jay Carafano
College Station, Texas: Texas A&M University Press, 2002.
288 pp. $44.95
[ISBN: 1–58544–213–5]

While overshadowed by the more familiar account of postwar Germany, the occupation of Austria is a fascinating study in Cold War history, replete with Allied friction, civil disorder, clandestine operations, bureaucratic infighting, and political reversals. Of the works that have appeared on this subject in the intervening decades, few have had the access to the historical records cited in *Waltzing into the Cold War: The Struggle for Occupied Austria*.

The author, James Jay Carafano, has taught military history at West Point and served as executive editor of *Joint Force Quarterly*. His story of the U.S. military role in Austria fills out an understanding of what happened on the ground after World War II. Particularly engaging is the struggle of the Army to carry out an occupation for which it was ill prepared. This work is not only a contribution to the scholarship on postwar Austria and the origins of the Cold War, but a case study of post-conflict operations and civil-military relations.

The central argument of the book is that American policy in Austria was dominated by security concerns—often at the expense of broader interests—which reflected the strengths and weaknesses of a military woefully unprepared to win the peace. U.S. thinking was influenced by habits that were locked in a warfighting doctrine with little capacity to shift toward nuanced political concerns when hostilities ended. The militarized nature of policy led to mixed results: it complicated and prolonged the occupation but also gave added importance to a state in which America had historically held little interest, ensuring the economic and diplomatic support that facilitated its postwar recovery.

American inflexibility drove occupation policy, according to Carafano. U.S. forces were preoccupied with warfighting long after the last shot was fired and neglected peacetime duties. They were concerned over disarming, demobilizing, and countering upheaval—without evaluating the political situation, coordinating with the Allies, and planning to address civilian needs. "Lack of experience, inadequate skills in interagency operations, unimaginative doctrine, poor training, and shallow professional education thoroughly exacerbated . . . limitations in men and equipment." These problems unnecessarily complicated a return to civilian government and may in the longer run have delayed signing of the four-power Austrian State Treaty in 1955.

One unproductive habit of the Army was drawing black and white distinctions between friends and enemies. Although declared the first victim of the *Aunschluss* in 1945, Austria had been integral to the Nazi war machine. Occupation policy in the early postwar years reflected this ambiguity. U.S. forces alienated Austrians with clumsy nonfraternization rules and unfair requisitioning of housing from resistance members while Americans expected to be quartered and treated as liberators. Two years later the military shifted to a different view, influenced by the Soviet threat, even as declassified intelligence reports reflected no change in local events. With the Soviet Union as the enemy, the American military essentially recast every Austrian as a friend, naively ignoring signs of right-wing influence in the gendarmerie, which Washington was secretly arming. Indeed, with respect to postwar intelligence, Carafano pulls no punches:

United States Forces Austria did not provide unbiased and critical analysis. Following the rhythm of habits, the command generated intelligence based on the identified threat. In turn, [the American] *reporting method justified concerns over Soviet intentions with a tendency to reinforce existing preconceptions.*

For the Army, peacetime was just another battlefield. And the lines had been drawn.

The strength of this book is a careful analysis of military policy toward Austria. There was a lack of national guidance, especially in the early days of occupation, which was reflected on the ground. Thus Carafano argues that policy emanated from below rather than from above. Indeed, he emphasizes the influence of U.S. high commissioners, in particular General Geoffrey Keyes, who had virtually unlimited freedom of action because attention at home was directed toward Germany. Commissioners and their staffs wielded tremendous influence, transforming Austria into a frontline state. It must be noted, however, that these observations may not be entirely fair since they reflect a detailed study of the U.S. military, not the twists and turns of Soviet policy. Final judgment on the claim that the Army was an important factor in militarizing the Cold War must await detailed examination of the other major players.

Carafano is a good storyteller, making the characters and the events of postwar Austria as engrossing as a novel. It is well worth picking up his book for its description of the Army at a critical point in its history. *Waltzing into the Cold War* is not limited to technical problems in one quarter of Europe but treats larger themes: civil-military relations, occupation government, humanitarian relief, et al. There is much that resonates with recent operations in Bosnia, Kosovo, Afghanistan, and Iraq. But, as the author observes, "The most powerful force of habit shaping the U.S. effort was a tradition of forgetting." One can hope that policymakers who read this book avoid perpetuating that tradition. **JFQ**

Audrey Kurth Cronin is the author of *Great Power Politics and the Struggle over Austria, 1945–1955.*

U.S. Air Force (Efrain Gonzalez)

U.S. Navy (David C. Mercil)

U.S. Marine Corps

what they've said in JFQ . . .

it is hard to think of a nonmilitary role without precedent for such roles are as American as apple pie
—Samuel P. Huntington

the mission and the Rwandans fell victim to inflated expectations that the United Nations could not fulfill
—R.A. Dallaire and B. Poulin

Roosevelt knew that generals could make disastrous military mistakes, not merely political ones
—Eliot A. Cohen

evolutionary innovation depends on organizational focus over time rather than guidance by one individual
—Williamson Murray

to achieve more efficient use of defense resources, Congress looked to the Chairman
—James R. Locher III

advanced courses on proliferation and counterproliferation reach only a small fraction of students
—Robert G. Joseph

military power can sometimes be brought to bear when it is applied without first defeating defending enemy forces
—Carl H. Builder

the system of systems is intelligible and applicable to an enemy through its component parts
—James Stavridis

lack of detailed intelligence on Grenadian defenses compelled planners to opt for a sudden attack with overwhelming force
—Ronald H. Cole

55th Signal Company (Cory Montgomery)

786th Communications Squadron (Edward D Holzapfel)

1st Combat Camera Squadron (Jim Varhegyi)

the higher careerists rise, the more they see their role as protectors of service traditions, doctrine, and loyalties
—William A. Owens

to tackle the fog and friction of war is not akin to exploring unknown terrain
—Colin S. Gray

despite the recognition that graduated pressure was fatally flawed, the Joint Chiefs were unable to articulate their objections or alternatives
—H.R. McMaster

interdependent maneuver calls for a fully joint approach, generating synergy between fire and movement
—Antulio J. Echevarria II

with micronavigation components, many dumb munitions could be transformed into PGM-like weapons
—Shannon L. Callahan

history suggests that the denial of military experience increases the long-term suffering inherent in combat
—Barry R. McCaffrey

if there ever was a function worthy of civilianization and privatization, civil affairs is it
—Charles J. Dunlap, Jr.

gradualism may be here to stay if U.S. leaders opt to fight more wars for amorphous interests with a disparate set of allies
—Benjamin S. Lambeth

an active, sustained partnership between the public and private sectors will be essential in the case of bio-defense
—Michèle A. Flournoy

. . . a reprise in the next issue